University of Alberta

Do Make Say Think: A Praxis in Knowledge

by

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A thesis submitted to the Faculty of Graduate Studies and Research
in partial fulfillment of the requirements for the degree of

Master of Design
in
Industrial Design

Department of Art and Design

Fall 2013
Edmonton, Alberta

Do Make Say Think: A Praxis of Knowledge

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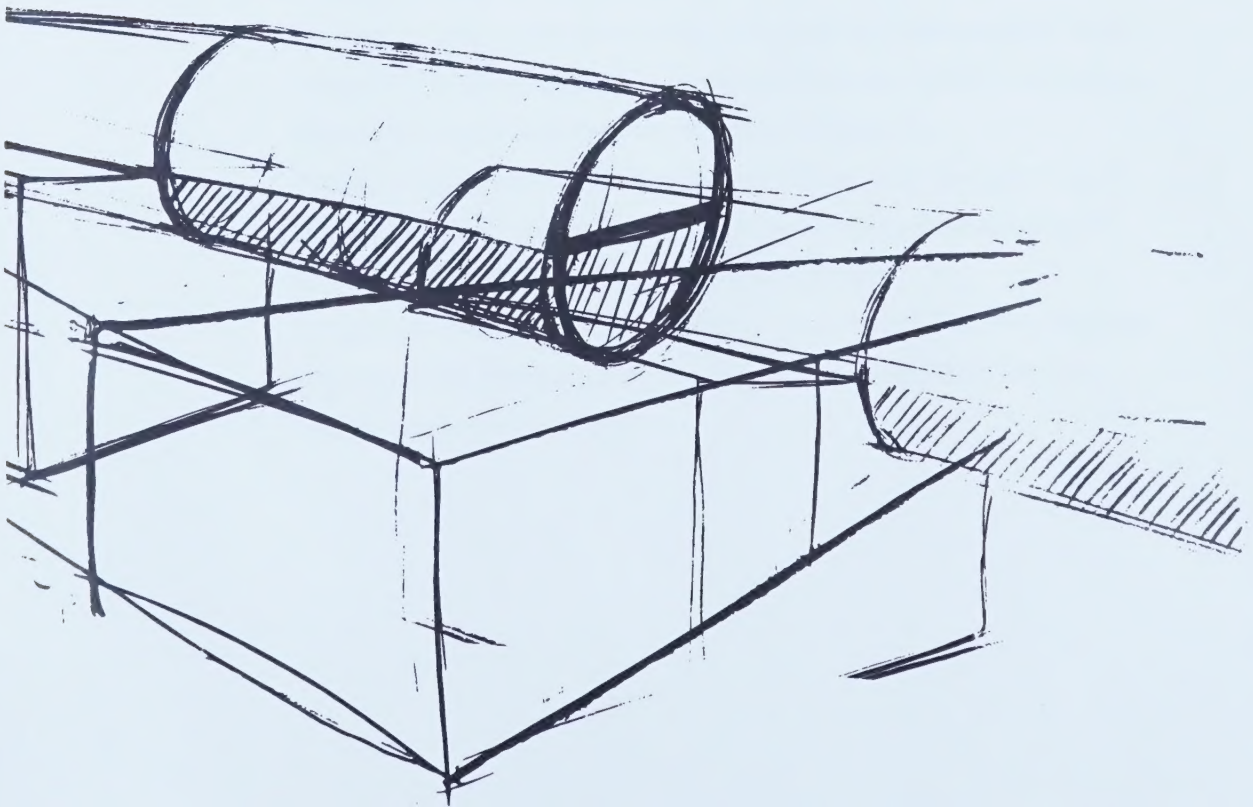

Acknowledgements

First and foremost I would like to thank my advisor Gavin Renwick, without whom I would have never had the confidence to pursue such a research topic and methodology.

Thank you Kenny, for your patience and words, your teaching and listening. Thanks Marc for allowing me to watch him work and Jane for her willingness to answer my numerous questions. And also thank you to Sue for your kindness and binding expertise.

I'd like to thank Wendy Gunn for her hospitality in Sonderborg, and support throughout my time at SPIRE.

I thank my professors, Tim Antoniuk, and Rob Lederer for their instruction and guidance.

Thanks to Grace, Mandy, Brendan and Chris committing to and engaging in what at times seemed to be ambiguous activities with unknown outcomes, your faith was much appreciated. I also thank the multiple participants in my PaperProject workshops.

I thank Iwona who was there for every question, project and idea I needed to run by someone, as well as those beers I needed to share.

To Andrea, your constant friendship, support, and willingness to drop everything to help is something I will never be able to fully reciprocate, Edmonton would not have been the same without you.

Finally, to my parents, I am forever grateful for your constant support, love and concern, and especially your constant long distance contact (even if that gratefulness wasn't always apparent).

I would also like to thank the Edmonton Arts Council for their financial support, which allowed for my travel to Sonderborg, Denmark as a visiting researcher at SPIRE.

Abstract

This thesis aims to understand the opportunities for learning, and the generation of creativity and knowledge provided by one's engagement in craft and skill based ways of making and doing. In order to understand the benefits of such tactility within design education I studied the concept of apprenticeship through its most basic means: socialization, or perhaps more accurately, *situated learning*. Utilizing this method, I was able to take what is intangible knowledge and translate it into an accessible medium that could be critically discussed and reflected upon. The material outcomes of this research are the products of orchestrated collaborative activities between art and design practitioners, students and myself.

TABLE OF CONTENTS

Acknowledgements 3

Abstract 5

Table of Contents 7

PROLOGUE: ENGAGEMENT

Workshop Orientation Through Chair Construction 9

PART 1: AN INTRODUCTION 13

PART 2: METHODOLOGY

Design and Practice Based Research 35

PART 3: TEACHING, LEARNING, DOING

Testimonials in Making 53

PART 4: CASE STUDIES

Collaboration in Learning Through Doing 81

PART 5: CONCLUSIONS AND BEYOND 119

Appendices 135

Bibliography 143

Participant Consent 147

Engagement: Workshop Orientation Through Chair Construction

The chair became a collaborative effort through which I would gain a sense of understanding within the workshop from the very beginning of my time at the University of Alberta. I undertook my Master of Design degree in industrial design in order to immerse myself in a new way of learning, to engage in design at a small scale, and to take part in a design studio at a hands-on level. This way of working though, was not one that was forced upon me by the program itself, and it quickly became clear that if I were interested in working in the shop it would need to occur on my own accord.

Image 1: Preliminary Chair Detail

When Iwona approached me to see if I was interested in collaborating with her on a small project we had been conceptualizing I jumped at the opportunity to create with a student of advanced awareness and comfortability in the workshop environment. Together we sketched, planned and designed a chair that throughout the process lost its original meaning, but became much more. She took time to allow me to make mistakes, learn how to use the tricky tools and ask the dumb questions. And as things became less intimidating she took smaller and smaller a role in the process. And of course Kenny was there too, willing to lend a helping hand, show an easier way, or a harder one when he thought it would be most beneficial to our process, or just plain good for us. And in this way, I got through my first year.

Image 2: Preliminary Chair Connection Solution

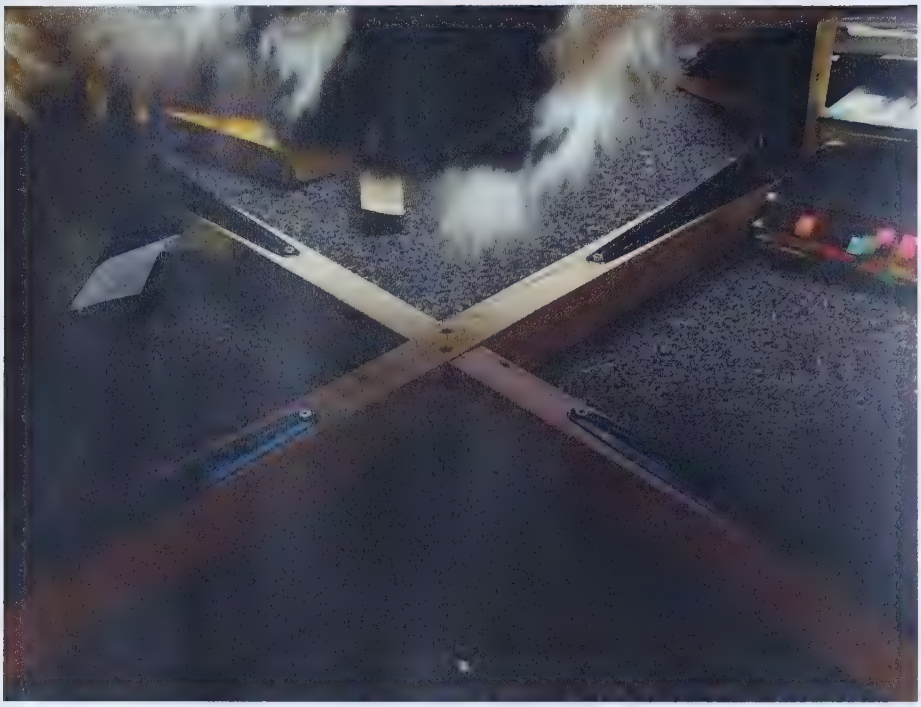

Image 3: Second Iteration, CNC Pieces provided an obscure geometry

Image 4: More resolved geometries from engaging with previous model with hands

PART 1:
An Introduction

"Learning is understanding in practice."

-Wendy Gunn, *Learning to Ask Naïve Questions*. p. 325

The Document

This document is to serve as a reflexive exploration of skill based knowledge and the act of making as a way of learning and creating new ways of thinking within and beyond an academic setting. Such a reflexive methodology allowed for a constant negotiation of inputs and outputs, and provided for research roles that could be swapped between participant and observer as required. To further this research, exploration has been done into the use of skill-based collaborative knowledge exchange as a way of facilitating learning through doing. While much of the following research was undertaken through personal engagement and observation, it is meant to be a revelatory body of work, illustrating possibilities for further thought, question, and consideration. Similarly to the ways in which Finlay has discussed reflexive research;

> We understand that meanings are negotiated within particular social contexts so that another researcher will unfold a different story. We no longer seek to eradicate the researcher's presence – instead subjectivity in research is transformed from a problem to an opportunity.[1]

To begin, a discussion of the methodologies used throughout this body of work which employ a more comprehensive, full bodied, and social way of contracting and creating knowledge. Understanding the opportunities that are provided through the emerging field of design anthropology[2], and the idea of practice based research preformed through the design anthropologist's lens, these methodologies have been adapted to contract useful data from practitioners, students and educators regarding the prospects of working and learning through one's hands. The ideas of direct knowledge transfer through activity,

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[1] Linda Finlay, "Negotiating the Swamp: The Opportunity and Challenge of Reflexivity in Research Practice," Qualitative Research 2 (2002): 212.

[2] *Design Anthropology* is a developing field which works to challenge conventional thinking regarding the nature of design and creativity, in a way that acknowledges the improvisatory skills and perceptual acuity of people. (Wendy Gunn, *Design and Anthropology*, (London: Ashgate, 2012).

and the collaborative efforts that support this way of learning, serve as a basis for the further investigation, and a platform to question current models of pedagogy, as well as historical ideas of apprenticeship.

Using craft and skill based practitioners as a model for how to learn through generative action, my exploration is based in understanding how an analogue way of practice affects both the mental and visceral processes of an actor, and in turn, how this can work to expose inherent societal propensities towards physical engagement and making. Utilizing *doing* as an inherently accessible learning platform, this will provide a way to further inculcate the idea of a making based explorational learning tool within design, as well as within a greater context.

Upon embarking on this research, I ask:

- While such a bodily experience has been utilized for centuries in many forms, how can learning through doing be better considered and more successfully implemented?
- Why is this a critical time for which to reconsider this way of learning?
- Is this method of learning underutilized in the academic setting?
- How and why do practitioners work and practice the way they do?
- What are the most beneficial ways of learning these ways of making and doing?
- And most importantly, where do we go from here?

Skill and Craft: A Foundation

Craft-based ways of making have become obsolete as a predominant form of production on a mass-market scale. Efficiency-centric systems incorporating division of labour, specialization and highly technical

mechanics have replaced the handmade for time, cost, and quality control purposes nearly globally. But while they do not serve as a means of producing the goods that are most commonly purchased and used, the recognition of the time-intensive and detail oriented processes of craftwork has remained, and to a certain extent, experienced a resurgence of late. What are the reasons for this interest in, what some may consider, an archaic 'art form'?

When deliberating upon the graduate program I wanted to enroll in, the first consideration, and in turn the inevitable deciding factor, was scale. I had worked in the construction and architecture field and felt a true disconnection between what was conceived or conceptualized, and that which was inevitably built. I had a longing for the ability to have real impact on the way that things became, and I knew that this would be very difficult in a large-scale construction environment, where ideas were compromised for budget, building code, or governmental policy. I therefore searched for a program in which to grow my ability to personally affect, engage and exercise agency on a much broader scale.

This experience brought me to reconsider the concept of individual agency, and catalyzed a realization of an internal propensity to act and see the affects of my acting within the world.

> So much of our lives today are projected from afar by vast impersonal forces. We worry that we are becoming stupider, and begin to wonder if we are getting an adequate grasp on the world. (...) we have come to live in a world that precisely does not elicit our instrumentality, the embodied kind that is original to us.[3]

The influx of personal engagement in the act of creating is overtly detectable within current popular culture. A visibly renewed interest in the handmade and bespoke has spurred such initiatives as Etsy, urban-chic knitting groups and online resources such as

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[3] Matthew Crawford, *The Case for Working with Your Hands* (London: Viking, 2009), 69.

thisismadebyhand.com. While these have produced outcomes considered to be of varying success[4] there is an unquestionable desire for people to create and engage with their worlds, and to share the resulting products. People are willing to pay premiums to have and use items that have been created with care, are unique, and of high quality. But even more than that, people themselves are willing to re-engage, to create on their own accord and exercise upon their urge to enact. Colin Spoelman discusses the unconventional small-scale process that he employs at the Kings County Distillery in Brooklyn:

> Rather than sort of thinking the worst, [our customers] thought the best. And that (...) was a testament mostly to people who buy products, and appreciate when a lot of labour goes into something, and when something is done that is very contrary to the prevailing way that people do something.[5]

It seems that even in a world run by IKEA, Walmart and paying the least to get the most, there are increasingly more people taking part in time consuming, 'inefficient' craft working such as wood turning and knitting. What compels people to engage in these activities? "What if we are inherently instrumental, or pragmatically oriented, all the way down, and the use of tools is really fundamental to the way human beings inhabit the world?"[6]

Craft Knowledge: Why Does it Even Matter?

Anaxagoras, the pre-Socratic Greek philosopher stated, "It is by having hands that man is the most intelligent of animals."[7] This indicates that

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[4] For example, Regresty.com is a parody of Etsy.com, which brings to light the poorly crafted or considered wares available for sale on the original website.

[5] Colin Weatherby "Why Maintaining a DIY Ethos Can Endear Customers to Your Brand," *Fast Company* (blog), April 15, 2013 (6:02 a.m.), http://www.fastcompany.com/3008282/takeaway/why-maintaining-diy-ethos-can-endear-customers-your-brand?partner=newsletter

[6] Crawford, *Case for Working*, 68

[7] qtd. in Crawford, *Case for Working*, 68.

beyond the dexterous ability to work that makes man intelligent, the thought processes that are involved in activities not based on survival requirements are of the highest thought order. There indeed exists an innate pleasure and human desire to engage practically in one's world, much of the arts and crafts movement having been spawned by the want to reinvestigate obsolete ways of working in search for a 'fulfilling life'[8] If this thinking is true, and if we as a human race do have an undeniable need to work with and engage within people's worlds, what is the consequence of a social structure that is not allowing us to do so?

Instrumental rationality, or the application of any means to an end, is what many (and most notably Heidegger) have deemed a main concern with technological advancement and a lack of human moral consideration. But much of the problem seems not to stem from the concept of 'instrumental rationality,' but rather the reality that we have come to live in a world that precisely does not elicit people's embodied instrumentality. We have too few occasions to *do* anything, because of a certain predetermination of things from afar. Discussing this displaced agency in people's worlds, Crawford writes, "It is precisely this experience of remote control that makes the spirited man angry."[9]

The present societal situation then, has constructed an opportunity. If humans yearn for the ability to do, make, say, think, and engage then craft and skill work creates a way of connecting those interested, but never exposed to such action, to the occasion to take part.

Knowing this, one can then begin to assume that this underutilized way of working can act as a way to meaningfully connect and engage. But to do so, one must first understand what the specific aspects of such ways of practicing are that contain potential benefits for ways of working, learning and problem solving. Can this way of engagement be used as

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[8] Peter Dormer, *The Art of the Maker* (London: Thames and Hudson, 1994), 13.

[9] Crawford, *Case for Working*, 69.

an unconventional means to arrive at new knowledge and affect current designerly ways of thinking, learning and knowing?

First though, we must understand the type of knowledge that is present in situations of making, how such knowledge is transferred, and how those involved in such situations (as observants, participants, or both) can gain from, or contribute to such activity.

Advancing technologies have transformed the way in which designers create, and can play a role in dictating methodological choices and aesthetic decisions. Many skill based ways of making are being lost to such technologies and with them, their respective narratives and cultural lineages. Walter Benjamin discusses the intrinsic connection between craft and story, describing the passing down of practical knowledge and experience as the worker loses themselves in their work.[10] Technologies provide exceptional opportunities, but designers must work to utilize current manufacturing technologies in a way that serves the design itself, and choices in making processes should be done so through thoroughly resolved means. This will also work to curb the current proliferation of objects and systems produced that are disconnected from their original designer, and are often quick, cheap and transient solutions perpetuating the disposable mentality of western society.

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[10] Esther Leslie. *Walter Benjamin: Traces of Craft.* Obscure Objects of Desire. Ed. Tanya Harrod (London: Crafts Council, 1997.), 21.

"For the things we have to learn before we can do them, we learn by doing them, e.g. men become builders by building and lyreplayers by playing the lyre; so too we become just by doing just acts, temperate by doing temperate acts, brave by doing brave acts."

-Aristotle, *Nicomachean ethics, Book 2, Chapter 1*, p. 31-2

Tacit Knowledge and The Ways We Learn

The idea that one can learn through action, and that knowledge can be passed through action is not new in the academic or professional world. Apprenticeship as a way of transferring knowledge is a method exercised because of its direct learning opportunities and ability to convey ways of doing that cannot be described or detailed through verbal language. Tacit knowledge, knowledge that cannot be verbally described, but more readily shown or enacted and gained through experience, is the primary mode of teaching a skill or craft from an expert to a student or apprentice.[11] As Michael Polanyi, the Hungarian polymath has famously stated, "We can know more than we can tell."[12]

> The particular 'touch' of a violinist, pianist, draughtsmaster, surgeon, nurse or vet cannot be described, but it can be demonstrated and, to a degree, be imitated or even learned wholly by someone else.[13]

This method is a pedagogical model instilled in us from birth. Human's mimic, observe and react, test, try, fail and try again. First words become clearer with repetition, and first bites come closer to the mouth. We learn because we are immersed, and we assume the culture around us as part of the learning experience. We are not put in a classroom, nor taught lessons according to plan, we don't raise one's hand to ask a question. Socialization is the most basic form of what one may consider apprenticeship or perhaps more accurately, *situated learning.*

Peter Dormer discusses the concept of 'going native' in order to learn social rules and cultural norms. "These constitutive rules do not regulate our behaviour: they actually are our behaviour."[14] The context

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[11] Dormer, *Art of Maker,* 14.

[12] Michael Polanyi, *The Tacit Dimension* (New York: Anchor Books, 1967), 4.

[13] Dormer, *Art of Maker,* 14.

[14] Dormer, *Art of Maker,* 42.

within which one works becomes how one enacts, and outcomes of processes are direct products of these instated rules. Further, the idea of situated learning refers to the often-unintentional way in which one internalizes knowledge through submersion within a specific context.[15] Described as an intrinsic characteristic of social practice, Lave & Wegner use this term to discuss the way in which a person develops a "comprehensive understanding" and how "agent, activity, and the world mutually constitute each other."[16] This theory is expanded into the understanding that learning occurs, not due to intentional teaching or instruction, but rather, as a product of one's engagement in the world, both social and physical.[17] As a corollary, the idea that there can be learning without context does not exist. All learning forms occur within some sort of social or cultural framework, even knowledge accessed within a traditional classroom or similar seemingly 'de-contextualized' setting.

Considering context adds another dimension to what is being taught and how we learn it. If we indeed do learn by doing, and assume knowledge through action, what is the peripheral learning that is occurring, and how can that be better considered within an educational context?

The immersion within a specific milieu as a way of transferring knowledge creates another layer of learning, particularly within a making setting. Not only are actors gaining from the task at hand, they are also privy to the cultural, social, and physical factors of the environment around them. Such traditional characteristics of context can be furthered by considering the person themselves as an aspect of context including one's mindset, interests, and personal stakes held

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[15] Jean Lave and Etienne Wenger, *Situated Learning: Legitimate Peripheral Participation* (Cambridge: Cambridge University Press, 1991), 31.

[16] Lave and Wenger, *Situated Learning*, 33.

[17] Lave and Wenger, *Situated Learning*, 41-3.

within the activity. All of these factors affect the learning process, and, when considered case specifically within the activity of making, can be used to assess the process's viability as a vehicle for learning.[18]

FAB LAB: A Case Study in Learning Through Doing

At MIT, Neil Gershenfeld has created a course based on the idea of utilizing technology to fabricate products "for a market of one".[19] The response to such a class was unexpected, the course fully enrolled semester after semester with an unlikely combination of interdisciplinary students all with ideas for personalized products not currently available in the mass market. But more interestingly than the students' interest in making objects unavailable in the mass-market was the way in which they learned to do so. Rather than employing the more traditional learning model of master/apprentice, students formed "something of an intellectual pyramid scheme."[20]

> Just as a typical working engineer would not have the design and manufacturing skills to personally produce one of these projects, no single curriculum or teacher could cover the needs of such a heterogeneous group of people and machines. Instead, the learning process was driven by the demand for, rather than the supply of, knowledge. Once students mastered a new capability, such as waterjet cutting or microcontroller programming, they had a near-evangelical interest in showing others how to use it. As students needed new skills for their projects they would learn them from their peers and then in turn pass them on. Along the way, they would leave behind extensive tutorial material that they assembled as they worked.[21]

The process of 'learning-it-as-you-need-it' stands in stark contrast to the educational institutions's model of 'learning-in-case-you-need-it'. By

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[18] Lave and Wenger, *Situated Learning*, 41-3.

[19] Neil Gershenfeld, *TED, Unleash Your Creativity in a Fab Lab*, Lecture Video, 17:22, February 2007, http://www.ted.com/talks/neil_gershenfeld_on_fab_labs.html

[20] Neil Gershenfeld, *Fab: The Coming Revolution on Your Desktop—from Personal Computers to Personal Fabrication* (New York: Basic Books, 2005), 7.

[21] Gershenfeld, *Fab*, 7.

acquiring knowledge through collaboration and doing, the students enrolled in the course "How to Make (almost) Anything" were able to troubleshoot, learn from one another, and better understand ways of doing, creating, and working together within a complex system. The students were learning to converse in a new language, through making. "They were inventing a new physical notion of literacy (...) using millions of dollars' worth of machinery for technological expression every bit as eloquent as a sonnet or a painting."[22]

Those enrolled in the course did so of personal interest. This course wasn't a requirement for a degree, nor did they need it to apply for a specific job in their professional domain. There was proven intrigue in the idea of being able to make and engage in a way that was not prescribed within their standard educational requirements, and participants were able to connect with one another through this engagement. Most importantly, they lost any predispositions that they held towards each other's disciplines. Barriers between the students were eliminated for the common good, and although each had enrolled in the class as individuals, these ends were reached through an inevitable collaborative means.

To Act and Reflect

As the foundation from which to begin the investigation of a relationship between craft knowledge and a designer's way of knowing, it was important to assume a specific way of working that was conducive to the subject.

Most designers would agree that to reflect as one works is a rule of good practice. A designer must have a conversation with a problem.

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[22] Gershenfeld, *Fab*, 7.

The situation is assumed or accepted as such to begin, but the original circumstance may change as the back-and-forth dialogue within the whole continues.[23] "Each move is a local experiment which contributes to the global experiment of reframing the problem."[24] One decision becomes an implication of another, and without reference origins for such decision making, one can easily digress.

These *feedback loops*[25] are essential in a designer's process. They form the connections between what is initially assumed, what is assumed based on these assumptions, and what in actuality is being acted out. There is an overt connection between research done and design work produced, and in this way a designer is allowed checkpoints to assess decisions made both independently and with collaborators.

"Designing is, in its own way, a process of reflection-in-action."[26] As one designs, inherent descriptions of the design are formulated, and these descriptions force the designer to engage in reflection of their activity. Such description is central to the methodology employed throughout my research. By creating checkpoints or points of reflection upon action, participants formulated thoughts to explain their design in process.

Although the design process can be filled with uncertainty, by framing potentially problematic aspects within design problems one can provoke unexpected responses, "back talk that gives the situation a new meaning." This gives the designer an opportunity to respond and reframe the design problem. "It is this ensemble of problem framing, on-the-spot experiment, detection of consequences and implications,

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[23] Donald A. Schon, *The Reflective Practitioner: How Professionals Think in Action* (New York: Basic Books, 1983), 79.

[24] Schon, *Reflective Practitioner*, 94.

[25] *Feedback loops* are a process in which information about the past or the present influences the same phenomenon in the present or future.

[26] Donald A. Schon, *Educating the Reflective Practitioner* (San Francisco: Jossey-Bass Publishers, 1987), 114.

back talk and response to back talk, that constitutes a reflective conversation with the materials of a situation."[27]

As a whole, reflection-in-action became a primary point of reference throughout my explorations of the making process. Watching for moments of potential description, both personally as I worked and as a method for those I worked with, became a way of explicitly uncovering the inner workings of what was being enacted. Such thought processes that are often assumed, but not considered.

But it was a reflexive process that served as my over-arching research method, constant consideration occurring between cause and effect in the research process. To understand how my practice itself could function as research, it was critical that I spent time comparing what I previously thought with new ways of thinking that evolved following the performance of specific acts and engaging in particular ways of working. Alvesson and Skoldberg discuss how the designer or artist almost "intuitively adopts the dual roles of the researcher and the researched, and the process changes both perspectives because creative and critical inquiry is a reflexive process."[28] Maintaining such a critical discourse between myself, my work and those with whom I interacted provided a crucial contribution to the investigative journey in understanding the opportunities and benefits in working and learning in a physically engaging way.

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[27] Schon, *Educating the Reflective Practitioner*, 158.

[28] R. T. Dean and Hazel Smith, *Practice-Led Research, Research-Led Practice In The Creative Arts* (Edinburgh: Edinburgh University Press, 2009) 13.

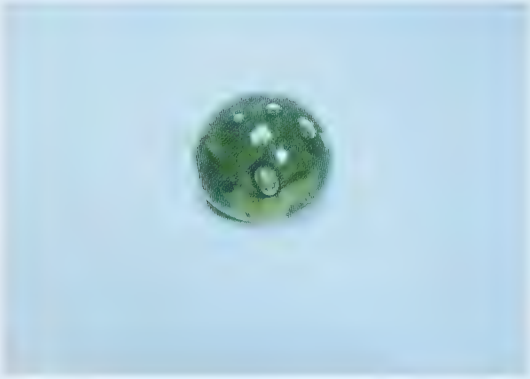
Engagement: Glass Blowing

As I sit down at the bench I am overwhelmed with fear. I'm aware that the feeling is stemming from the unknown, and while I've been watching practiced blowers now for a full morning, I feel I still have no idea where I am actually to start. My confidence is absolutely non-existent. I turn to my neighbouring blower to watch how the process begins. Dip the pipe in the molten glass filled furnace, spin, lift, remove from the glory hole. Easy enough, and I've gone through these steps numerous times in my head. After selecting an appropriate pipe I go in for my first dip, the heat from the furnace uncomfortably hot on my closest hand. I pull back, quickly realizing that my gather is not what it is supposed to be. Unsure, I again check with my neighbour as they begin to shape their gather of liquid glass. Thinking that this mis-gather can be sorted by muscling it into shape, I sit down at the bench to get to work. "Go back for another" the technician instructs, "it'll be much easier to form a more even gather." Realizing that the glass is quickly hardening and that I truly wouldn't have been able to shape this into anything close to a (very simple) paperweight, I return to the glory hole for another attempt. "Much better," says the technician, still watching me now in order to ensure I stay on track. "Now you can begin forming.

As I quickly move towards the bench while attempting to consistently spin my pipe both in an attempt to keep the glass even and to avoid the glass plain dripping onto the ground, I am thinking about my next step. Swinging around the pipe as I place it down I immediately move towards the wad of soaked newsprint, a rudimentary tool used to shape the liquid glass into a desired form, and one that I have watched being used by every other practitioner throughout the morning session. Now you can watch a person shape a piece of molten glass ceaselessly without ever completely understanding the pressure, feel, and speed required to do so. And this was immediately apparent as I attempted to mimic what I had seen by applying the sopping paper to the underside of the blob of glass. Steam and hissing ensued as I pressed what was obviously much

too hard on the smooth glass surface. Streaks (dubbed 'skid marks') appeared instantly and indelibly on the material, and soon the glass was appearing obviously overworked. The blemishes created a narrative upon the glass that could be read by a knowing eye, but proved to be one of the most valuable teaching tools I encountered.

Image 5: First Glass Piece, a Heavy Paperweight



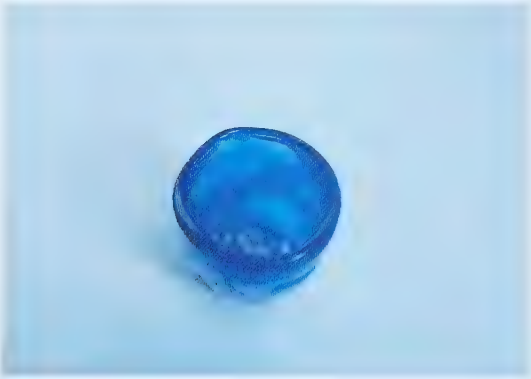


Image 6: Heavy-handed, skid marked glass

"Here, this is how it needs to feel," I heard as Katie, the instructor grabs my hand with the wet wad of newsprint in an attempt to recalibrate my pressure on the molten glass. I can feel how she cups the glass much more organically around my hand, she forces my fingers to wrap the glass, coaxing it, rather than forcing it into shape. But it's too late, and soon she recedes. "Just start again," she says, knowing that going for another gather on top of an improperly shaped first attempt would only exacerbate the situation.

I looked at the piece of glass that sat, hot but solidified, at the end of my pipe. While not necessarily beautiful, there was much to be learned by what remained there. The skid mark pattern, the way my uneven turning and heavy handed pressure had pushed the glass to one side of the pipe, the amount of glass that was covering the pipe and essentially unusable as it could not be removed as part of the blown object. The blob itself, and the unsuccessful attempt, had taught me more in 10 minutes than I had learned in 3 hours of observation. I carefully took note of each trace and the implied narrative of the piece, and returned to the glory hole for the second, of countless attempts at the perfect piece.

And by the end of the week I was finally able to understand how to converse with the glass, not dictate to it, and that made all the difference. While I was never able to replicate a preconceived drawing, or perfect a paper-thin glass wall, I was able to achieve beauty that the material knew I was capable of as a series of gestures between myself and the material, back and forth.

Throughout my experience at Red Deer College, never once was I taught without the use of a tangible explanation, through tool or molten glass. Everything I learned was done through observation, imitation and experimentation. Mishaps occurred constantly, but the progress from day 1 to 5 was overt. And after a few burns, I had overcome my fear of the hot furnace, the liquid glass's affect on my skin, and the permanence of each move I made. A great deal of my education occurred between the molten glass, and myself but there was also an important relationship that formed with an experienced blower. This relationship had less of a teacher-student dynamic, and was more about working through problems as they arose, watching her work, then emulating what she did. This was my first experience with true situated learning, understanding a process through direct apprenticeship and immediate problem solving.

Image 7: Smoother surfaces and thinner walls achieved in 8th attempt

Image 8: One of the final pieces, a product of mistakes, but the skill required to work through them and create a successful piece have been established.

PART 2:
Methodology: Design and Practice Based Research

Design Anthropology: Research With and Through Practice

There is seemingly no better or more honest way to understand why people do what they do than asking them while they are immersed within the act. To begin my exploration into craft, skill and making, I decided to place myself within the context of two technicians and experts of their crafts to truly appreciate the reasons and potential benefits of the ways they worked. Through this, I hoped to learn what it could mean for both designers, and the general population dealing with societal reprieve from physical engagement in making and doing.

The observational model used was based upon research of anthropological study, and the way in which an observer can gain from a people, culture or place. Quickly it was realized that simply watching, documenting and reflecting upon what was being seen would not be enough. To reveal the meaningfully rich information necessary for me to truly understand why it was that these people worked the way they did, how their work affected their lives and practices at large, and what it meant to them as craft working technicians to engage with their hands in a technologically advancing society, I would also need to engage in such work. This engagement would in turn allow me to ask questions stemming from my personal explorations into the process.

Design Anthropology is an approach that discusses the ways in which design and design processes define and are defined by the human ability to act, perceive and improvise. Consideration is given to how people and culture relates to design activity and the way objects, systems, and design thinking are employed within a given milieu. Tim Ingold upholds that anthropologists are meant to open up potentials for human life, asking the right questions and inquiring into what could be.[29] In

[29] Tim Ingold, *Making: Anthropology, Archaeology, Art and Architecture* (New York: Routledge, 2013) 4.

this way, observation becomes a catalyst for moving and thinking forwardly; progressing from what is to what can become.

SPIRE (Participatory Innovation Research Centre at the Mads Clausen Institute at the University of Southern Denmark) is a faculty based upon investigations in 'participatory innovation' grounded in the ways in which to engage multiple stakeholders within collaborative design and participatory activities. At the centre there is scarcely a moment that goes by undocumented. Visual recordings of discussions, reflections, and even seemingly unimportant gestures are collected and later dissected for what one foresees as an applicable purpose. And with each form of ethnographic research also comes a unique tool to understand the data. Here Jacob Buur, the Head of the Research Unit, has devised an activity that involves participants, having them analyzing video footage clips, in order to critically reflect upon the physical actions of those being filmed. Responses to the clips are then categorized in order to understand key themes running through a particular batch of recorded information. These videos can then provide direct insight into specific activities of those being observed, and the contexts within which they occur. These contexts can often prove as important to the design process, as the people within them.

"Context is not so much something into which someone is put, but an order of behaviour of which one is a part."[30] The environments people situate themselves in can often tell much about what a person values, and what enables them to live in the way that they choose. But it is also important to consider the contexts from which the multiple stakeholders participating in a collaborative design processes originate in order to successfully bring together participants in such a process.

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[30] Ray P. McDermott, *On Becoming Labelled – the story of Adam*, in Learners, Learning and Assessment, ed. P. Murphy (London: Paul Chapman Publishing Ltd., 1999), 15.

David Snowden discusses the importance of context in accessing knowledge. "In understanding what people know we have to recreate the context of their knowing if we are to ask a meaningful question or enable knowledge use."[31] Where people derive their knowledge from can affect how they contribute it, and therefore the contextual characteristics of a participant within a collaborative workshop are important to understand before bringing them together with distinct stakeholders. To fully engage participants in a multi-disciplinary nature, care must be taken to create situations within which they are comfortable and able to access and contribute knowledge and ideas freely.

To further re-think traditional anthropological methodologies I looked to Ingold, who discusses the process of an anthropologist practicing ethnography using the concept of gathering rather than projecting. The observation and subsequent description of the movements, reactions and characteristics of a subject can be constructed, "not of verbal composition but of line-making." He proposes what he has referred to as 'graphic anthropology' which calls for three things: "to follow the materials, copy the gestures and draw the lines."[32]

"Anthropologists can make understandings present. Anthropological concepts bring surprises; recast assumptions and reframe relations."[33] An important anthropological methodology is one that reconsiders conventional designer-centric systems. To incorporate multiple ways of thinking, and by "building closer relations between using and producing, designing and using, people and things, a move is required

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[31] David Snowden, *Complex Acts of Knowing: Paradox and Descriptive Self-awareness*, Journal of Knowledge Management 6, no. 2 (2002): 103.

[32] Tim Ingold, *Being Alive: Essays on Movement, Knowledge and Description* (New York: Routledge, 2011), 179.

[33] Jared Donovan and Wendy Gunn, *Design and Anthropology* (Burlington: Ashgate Publishing Company, 2012), 6.

away from a problem-oriented approach towards designing." Rather than having a set origin, the focus of design anthropology is on the processes, and flexible, open-ended ways of generative doing.[34]

Anthropologist Wendy Gunn goes further when discussing how to access information of these processes, explaining that the engagement of the researcher in the act is essential. "The way to understand how knowledge is acquired (...) is for the researcher to participate in the processes of its acquisition, and to reflect critically on these from the perspective of an insider."[35] Rather than posing as a passive observer, more beneficial information is contracted through the physical act of interaction or "bodily experience," using practice as a way of research. This act of study provides access to information that is often not adequately transferrable through language or transcription alone.[36]

The concept of doing an 'anthropology with' rather than 'on' allows opportunities in research, placing the investigator in direct proximity of those they are studying, doing with those who are doing. Wendy Gunn explains that by working alongside the observed (students, practitioners, or otherwise) a researcher or instructor is exploring with those that are acting or learning before them, and this proves a powerful way of understanding theories of pedagogical methodologies.[37] These 'anthropology with' methods were applied to collaborative activities done with printmakers, designers and introductory design students as a way to understand how the

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[34] Donovan and Gunn, *Design and Anthropology*, 1.

[35] Wendy Gunn, "Learning Within the Workplaces of Artists, Anthropologists and Architects: Making Stories for Drawings and Writings," in Skilled Visions: Between Apprenticeship and Standards, ed. C. Grasseni (New York: Berghahn Books, 2007), 108.

[36] Trevor H. J. Marchand, *Muscles, Morals and Mind: Craft Apprenticeship and the Formation of Person*, British Journal of Educational Studies, 56, no. 3 (2008): 245.

[37] Wendy Gunn, *Learning to Ask Naïve Questions with IT Product Design Students*, Arts and Humanities in Higher Education 7 (2008): 333.

knowledge was transferred, and to relay ways of learning to the participants.

The study of tactile practice and methods was heavily supported by critical and active reflexivity. Such practice in research, while not widely considered conventional, "encourages working from the 'unkonwn to the known' and it is purposeful yet open-ended, clear-sighted yet exploratory."[38] As a designer, a reflexive research method encourages decision making and questioning that is continually responsive to causes and effects of investigation. By engaging in multiple, unfamiliar skills, I was able to thoroughly assess how practice as a way of researching affected the seeing, considering and understanding of a greater context as a designer. This in turn, informed questions that I relayed to the practitioners themselves, particularly why and how they did what they did.

Furthering strict observation to skill acquisition would allow me to watch what is *going on*, rather than simply observe what is *out there*. By using Ingold's description of graphic anthropology as a foundation for ethnographic investigation, I worked to document ways of working by engaging in the acts themselves. The documentation of the way in which they work then became, in part, the artifacts that were products of such interactions and physical engagement. [39]

Furthermore, using the ideals of said graphic anthropology as a reflective technique for personal practice proved to be a propitious method for constructing a framework of self-inquiry while producing tangible documentation of an intangible process. Reflection-in-action

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[38] Dean and Smith, *Practice-Led Research*, 49.

[39] Ingold, *Being Alive*, 223.

can work to support Ingold's theory of a forward and fluid process through material mediation and response.[40]

Images 9 & 10: The binding process.

Practice based research

To embark on my personal learning process, I would use traditional ideas of apprenticeship. By situating myself within the immediate environments of skilled practitioners, I watched and imitated actions that they performed. Though this can be stated in a concise sentence, the process itself was in reality calculated and considered. While concentrating on obtaining skills and learning ways of making, I was also focused on ways I could make such tacit knowledge tangible as research. Niedderer agues that this idea of practice-as-research is an opportune way to include "the experiential part of knowledge which evades conventional communication by verbal or textual means and which is otherwise neglected by research because of prioritization of propositional knowledge."[41] This included understanding cultural and social influences within the practitioners context, and questioning how these factors affected the way they worked and how they in turn were contributing to my way of learning.

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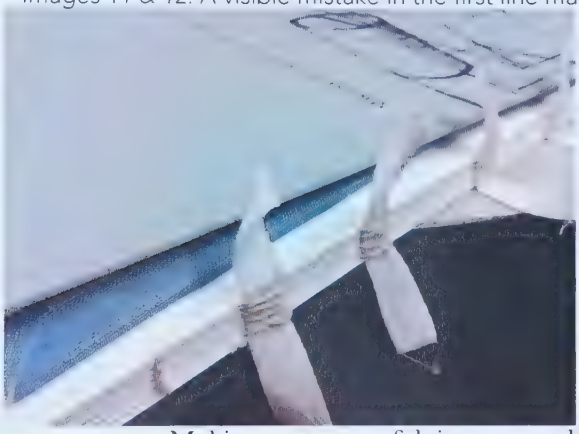
[40] Tim Ingold's theory is an idea that is less a means of conjuring up images of what is 'out there' than a way of living creatively in the world, imagination is immanent in perception itself, revealing the generative potential of a world that is not so much ready-made as continually on the brink of formation.

[41] Kristina Niedderer and Seymour Roworth-Stokes, "The Role and Use of Creative Practice in Research and its Contribution to Knowledge" (presentation, International Association of Societies of Design Research 2007, Hong Kong, China, November 12-15, 2007.

Practice based research is a method of furthering or bringing about new knowledge in a particular field through non text-based means. By producing and performing, a researcher can work to present new and innovative ideas and thought as a product of made works. These products can also create dialogue between viewers and the works themselves, providing another layer of knowledge creation through the act of doing. The artifacts themselves also have the ability to answer the research question, the researcher providing "a voice" to the pieces produced.[42]

Images 11 & 12: A visible mistake in the first line made me aware of the weaving technique onward.



Making as a way of doing research can be considered a backwards methodology. Instead of fully understanding a particular concept or theory by making in order to test, one is rather testing to understand a particular concept or theory. The making process is used as a way of questioning, and reflection upon such practice.

> In established fields of research, making is generally regarded as consequent to thinking – at least in theory. Thus a series of experiments, for example, is carried out in order to test a certain assumption, i.e. to solve a problem or answer a question. In the field of practice-led research, praxis has a more essential role: making is conceived to be the driving force behind the research and in certain

[42] Maarit Mäkelä, *On Reflecting and Making in Artistic Research*, Journal of Research Practice 7, no. 1 (2011): 5.

modes of practice also the creator of ideas.[43]

Using practice as a way of exposing tacit knowledge is the central ideal of practice based research. Such knowledge has the ability to be missed or misinterpreted within the realm of conventional research, and is often unattainable through conventional verbal or textual means.[44] Extracting tacit knowledge through this method allows access to procedural information that requires active and reactive judgments, and subsequently verifies this knowledge within and through the action and its resultant.

> ...tacit knowledge (...) is essential for the ability to execute and understand certain research tasks (skill associated with expertise) as well as to making discriminatory judgments (skill associated with connoisseurship).[45]

Images 12 & 13: Finished bind, spacing indicates covers not adequately covered, holes in pages indicate slipping of the needle. I feel the immediate need to try again.

[43] Dean and Smith, *Practice-Led Research*, 48.

[44] Niedderer and Seymour, *Creative Practice in Research*, 2.

[45] Ibid, 12.

Engagement: To Saw a Joint

I was inspired to practice the dovetail joint by Tim Ingold's testimonial entitled "Walking the Plank", an exercise in the generative act of sawing through a piece of wood, and the non-linear series of decisions and reactions that occur within the simple act of moving a blade across timber. His plain documentation of each step instigated an activity in simplistic making, one that would not require a lot of previous know-how, but would allow me to work through the process in a very reflective way coupling perception and action.[46]

Image 14: Re-attempts at angled cuts by eye.

To start this task I'm aware that I need to witness a joint constructed first. I closely watch as Kenny shows me approximations of angles that will be required for cutting, and how careful markings will ensure that I didn't over or undercut. The joint is meant to be tight, secure, and not ensuring the correct measurements will negate the purpose of the joint all together.

I start to feel more confident, and I select a piece of spruce and cut it in two, thus ensuring that the pieces are of the same thickness. I begin, as Kenny suggested, by marking an indentation to the depth of the joint using the opposite pieces width, as the pieces will be connecting at a ninety degree angle and will therefore be piercing each other through. Then, solely using my eye and memory, I take a sharp backsaw and begin saw cuts through six angled lines to the depth as marked. Tightened secure in the vice, it seemed as though my cuts will be inherently vertical, and after I've started the cuts carefully, following the stroke becomes easy, only jerking slightly when I can feel my saw has caught a grain. As the cuts reach closer to the line I have marked, I

[46] Ingold, *Being Alive*, 52.

slow my movements and lessen my pressure until I reach it. I then remove the piece of wood from the vice and inspect my work. Though the cuts on the front are a perfect depth, those on the side hidden from view are much too deep. I hadn't been focusing on an even push-pull; I had been focusing on the depth-line and how to get there.

Image 15: Slow cuts, feeling for the catch of the grain and careful observation from above to maintain a straight blade.

Images 16 & 17: First attempts at chiseling, slow, timid, and without intention. These yielded sloppy results.

I turn to grab a chisel to begin carving out the notches I had created. I start light, unsure of my movements. Realizing that a harder hit with the mallet will give me a cleaner chisel mark, I continue with more forced confidence, larger material removal, and a more satisfying response from the tool pushing through the wood. Kenny had emphasized how important sharp tools were in this instance, and the sharpness of the chisel is evident in its definitive nature. After removing the three notches of material I again re-inspect. Adjustments and changes in tool application had made for clean chisel cuts, but now the poor saw lines were even more evident in their non-vertical nature. I took to the edges with the chisel in order to straighten them, becoming frustrated with an inaccurate result.

Kenny hands me another piece of 2"x6", "I think you need to just take some time to practice straight cuts," he says as he begins drawing parallel lines along the top of the timber secured in the vice. As frustrated as I am, I take the saw to the first line and begin cutting more methodically. "Go slow, take breaks, look at the cut. Even I go slow," he says. I make sure my first strokes to cut the groove are slow but deliberate,

noticing how the teeth catch the wood grain differently depending on my pressure. As I follow my cut, I realize that it isn't that the teeth aren't actually catching on the wood, but it is my inconsistent pressure not allowing the saw to cut efficiently. I focus on strong smooth strokes, working into a rhythm of fluid motion. Soon I have reached the end of the cut, satisfied I remove the wood from the vise to observe. Crooked. Focusing on the smoothness of the cut I have forgotten to keep my blade straight. On the second attempt it is better, as I make certain that before I fall too comfortable into a rhythm I am sure to check my angle consistency. I am peering on top of the piece, ensuring that my saw blade doesn't waiver, and by the end of the 20 or so small incisions, I have completed three perfect cuts in a row, and have been able to keep a more constant saw tempo. I am becoming aware of the differences in pressure required, and how to compensate for a mis-stroke.

Equipped with the muscle memory of a perfect cut, I begin the 6 angled cuts for another attempt at the dovetail. In a sense, my hand will now be summoned into use, its movements guided by the internalized traces of past performance, "inscribed in an accustomed – that is usual – pattern of dexterous activity.[47]

Images 18, 19 & 20: Demonstration of flawed dovetail, able to be taken apart and put back together.

[47] Ingold, *Being Alive*, 57.

Image 21: Loosely fit dovetail, 5th attempt.

PART 3:
Teaching, Learning, Doing: Testimonials in Making

"Practitioners, I contend, are wanderers, wayfarers, whose skill lies in their ability to find the grain of the world's becoming and to follow its course while bending it to their evolving purpose."

-Tim Ingold, *Being Alive*, p. 211

To make in essence, is to set forth on a journey in order to arrive at the destination in the form of some sort of 'product', be it a sculpture, meal, symphony. What I argue here, is that the process of getting to the product is what provides the opportunities for self-reflection, questioning, reaction, engagement, and that practitioners undertake these acts in equal interest for what comes before the end as the end itself.

Acute understandings of the unexpected happenings in working are essential for a skilled craftperson. While actions are planned, and processes deliberate, "the product is made (...) with the result of each one predetermined and outside his control"[48] Rhythms are found in the making process, and an experienced maker falls into them quickly. But rhythms, while from the outside observer seem mindless, are rather a perfected set of continuous adjustments and responses. A heuristic process is applied to a set of problems that require quick decisions.[49] A skilled practitioner can make this "coupling of perception and action" appear automatic, to truly understand these constant perceptions one must only question the worker in progress to understand the dexterity required in a "workmanship of risk" that all hand working practitioners undertake.[50][51]

Touch of the hand provides the brain with unique sensations and information than that of a purely visual engagement. "Touch delivers invasive, "unbounded" data, whereas the eye supplies images that are contained in a

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[48] David Pye, *The Nature and Art of Workmanship* (Bethel, Connecticut: Cambium Press, 1968) 6.

[49] *Heuristic* is the involving or serving as an aid to learning, discovery or problem-solving by experimental and especially trial-and-error methods. Or or relating to exploratory problem-solving techniques that utilize self-education as the evaluation of feedback to improve performance. (Miriam-Webster Online, http://www.merriam-webster.com/dictionary/heuristic. Accessed September 4, 2013)

[50] Pye, *Nature of Workmanship*, 20.

[51] Ingold, *Being Alive*, 58.

frame."[52] When this is considered in relation to the series of habituated steps of coordinated acting within a making process, Sennett states that it is an "extended rhythm" between hand an eye that allow for such rituals to be built. But instead of these skills becoming embodied as performative repetitions, "we are alert rather than bored because we have developed the skill of anticipation."[53] It was this skill of anticipation that was one of the most overt but unexploited observations I would make in my work with the three craft based practitioners.

The Recreational Learner: Jane

Jane is a healthcare professional in her late forties, working for the Nurses Union in Edmonton, Alberta. Jane and I met while at Red Deer College, enrolled in a weeklong glass blowing course. Jane had taken up glass blowing about ten years prior, a response to curiosity that had been peaked as a child while traveling and visiting glass blowing studios and her mother's creative influence as a practicing fibre artist. The summer courses were a way for her to continue her practice for a few days a year and to meet and discuss with fellow blowers in a collaborative setting. "For me it's an interest, I don't like the word hobby. It's an interest but it's not a career, not my focus in life."[54] As a recreational blower, Jane has participated in the craft on and off for the past decade, but primarily has resided on the learning end of the activity's spectrum. This perspective on craft as a way of engaging provides insight dissimilar to the primary practitioner, into how knowledge is passed and created, not as an expert blower, but rather as someone looking to gain knowledge within a group of others of generally the same skill level.

When Jane began, she quickly became aware of the ways in which she would acquire this new skill best, and in turn, had a realization of her learning style

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[52] Sennett, *Craftsman*, 152.

[53] Ibid, 177.

[54] Jane Sustrik in discussion with the author.

of craft based thinking. "My first teacher, if I was to be perfectly honest with you, was the wrong teacher for me. (...) the first time you had glass, right, we all stop and look at it and it goes, and we panic. It's like, what do you, I don't know what to do. He would do a quick demo, then leave for a smoke, and there's no one to be found."[55] It was obvious to her that she needed another method to be able to better grasp glass blowing as a beginner.

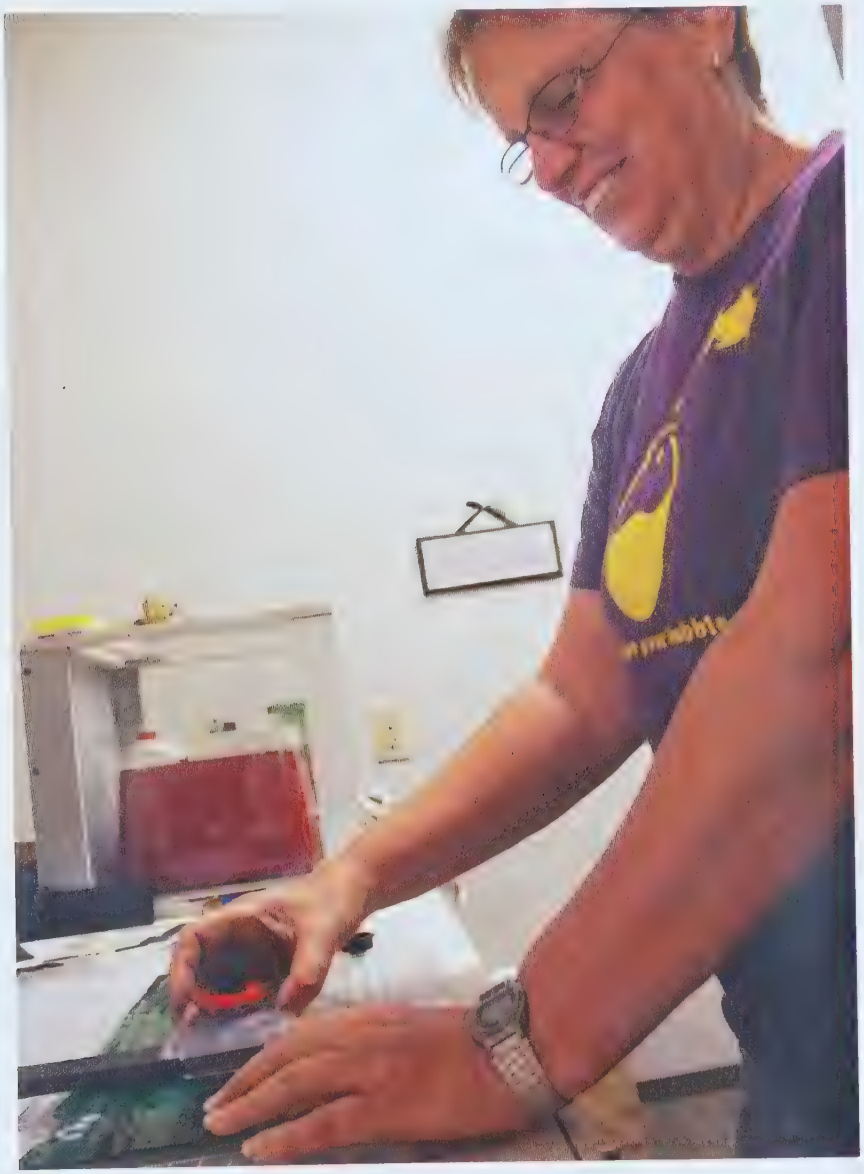


Image 22: Jane cutting glass in her home studio.

[55] Ibid.

While discouraged, Jane continued on her quest to learn, re-taking the class with a cousin. "We were still two people taking [the same] class, but knowing somebody that knows you makes it easier when you're struggling. Just knowing that somebody's understanding is the same as you, or if you're getting totally frustrated and you're thinking, 'is it just me?" In a new medium, the feeling of confidence is crucial for success. "When you don't have confidence it's easy to tell in your pieces you create." And while learning with her cousin provided her with the comfort of understanding that it was a difficult process, and the awareness of the fact that her inadequacies were 'normal', without sufficient expert support at such a beginner stage, Jane felt lost, frustrated, and nervous. "Some people can be told something in a lecture and they understand things, other people have to do something to understand it. I had to blow the glass to learn, I couldn't learn everything simply by watching a demo."[56]

When Jane finally found the teacher that would truly introduce her to the art of glass blowing, she immediately felt 'the click'. "I mean, [my first teacher] was a great glass blower and a great guy, but he just wasn't for me. And for him it was like, 'kay here is everything I know, go do it. For her [my second teacher] it was, here is everything I know, now let me work with you to understand what it is." Jane describes how she connected with this instructor, and how important it was for her to instill confidence within her students for them to be able to expand on their own; "She was a hands on teacher, she did demos but she had us help with the demos, so we were getting involved at the point. (...) I think because she involved me in the demos it helped too. Because you feel like you're not so stupid, like she must trust me, that sounds silly in glass blowing right?" But this is what it took for her to build the required confidence. "You have to believe that you're going to do something with it. And it might not turn out like you thought, but you gotta believe that you can master it. If you go in going, 'ah you know I don't know about this, it comes out in the glass! They say that, and you don't believe it when you start,

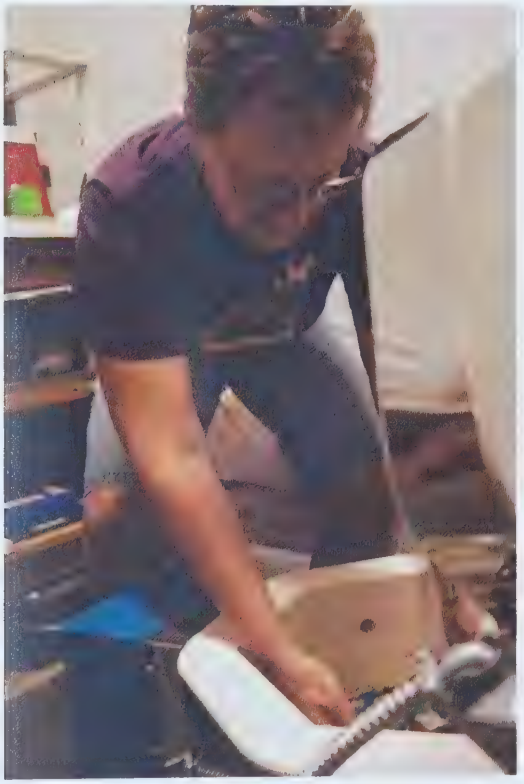
[56] Ibid.

but what you're feeling and thinking…you can really tell when you haven't been sure of yourself in the glass, and where you've said 'okay, that's good enough."[57]

And once she acquired the confidence to truly engage in the craft, Jane was able to use the making process as an outlet for her creativity, and from her everyday life. "I even crave it a little bit when I don't do it, but I would say that what I recognize from it is that when I do it, I leave everything else in life, I set it aside."[58]

And what was especially rewarding for her was the camaraderie that the communal studio, which she eventually joined provided for her practice and overall social wellbeing. She discussed what it was she missed when the studio closed its doors; "I miss having fun with people, and you get ideas you know. I have a certain way of thinking, a certain way of seeing things." The community offered a opportunity to learn through her practice with others. "This guy, Brian, who used to always work across the table, he would do bizarre things. And you know, nine times out of ten I would go 'I don't want to try that,' but then there would be something, to use that technique this way, lots of learning, lots of learning." Such sharing of knowledge was most often appreciated in pieces that were built together, utilizing the varying skills of the participants. "I did a big fused piece in the studio one time, it was a skyline. I wanted to do a night skyline and in fused glass you don't have shades of black. So there was a lot of

Image 24: Jane pulling a piece from her home kiln.



[57] Ibid.

[58] Ibid.

collaboration in how I could get the depth, in minimal colours, and how to depict skylines, and lights on a building, and pieces like that." Pieces like this would be saved for the communal studio time. "That was part of the Monday thing. (...) I used Monday [studio time] for something that I had never done, cause I knew there were people there, people who had either done it, or we'd brainstorm together, what's the best way to do it? (...) For me that's what it's about Right? Somebody else has knowledge, they can either help you, or put it together with something you have. (...) If I had my choice I would rather have a group or guild (...) that got together once a week. And as a nurse, I do like teaching. And I've always been like 'if I can, share whatever I know'. You know, there's some people who want to keep their secrets. I'm about sharing, let someone else have the joy."[59]

While Jane insisted that she was sometimes nervous about passing on wrong habits or techniques, she recognized when peer support was really helpful. "I know how exhausting it is, and I can't imagine trying to look after three benches [of blowers] (...) so you try to help out a little bit to bridge that. So yeah like I said, I like teaching, and though I don't think I have enough knowledge to pass on when it came to glass blowing, I tried to. Cause I remember what it's like to be really frustrated the first time, and some of it is just taking your time, breathing, like as long as you keep the glass on centre and you keep heating it you can keep going for awhile right?"[60] Teaching at this early stage is often more about instilling self-assurance while negating the feeling of helpless loneliness.

Working as a 9-5 healthcare professional, Jane uses glass processes as an escape, fully giving her mind to the task at hand. Her mind fully engages in glass, "It allows me to sink into the glass and forget about the goings on in my world. I get immersed in forming glass into something."[61] Indicative of the mental awareness required for even more experienced practitioners, Jane

[59] Ibid.

[60] Ibid.

[61] Ibid.

is able to forget her day-to-day life, and give into the full body experience of glasswork.

As we were parting, Jane wanted to share a final story about her years of experiences in glass working. The story described the trials and tribulations of learning a craft, and the rewarding nature of working through the process and overcoming its unexpected hardships. It truly summated the meaning of giving oneself to a process that can be unpredictable, while allowing oneself to be open to the benefits of learning through collaborative handwork:

> Can I tell you a story? So that first year in Red Deer with Laura Donafer, who's a great artist, she's out of Montreal. And I had a pretty good week, I had lots of help. Benji was her teaching aid, and they [the students] were a really good group and we got together every night, you know we had beers every night and we had a party one night where we all brought extra food. The whole group just seemed to mesh. And it was the last day, and I don't know if you were like this, you wanna do that perfect piece on the last day for your mom or something, so I was doing this piece and I loved it. And my partner just decided she had to leave, it was time for her to hit the road so I had no partner and I wasn't finished my piece so I needed help and nobody was around to help. And I think I asked Benji, and he was busy, said something and wondered away. And I lost it. Cause there's so much emotion in glass and you don't realize it right? So I started to break down, and I said just dump it, just take it. So I went off to the bathroom, cause I'm crying, thinking, 'Here's a forty year old woman crying over a piece of glass.' So. spent a little time there and one of the other teaching aides came and while I was in the washroom they kept heating it, just to keep it alive right? To hold it. Benji and I don't know if there was someone else helping, they made me come back and it was really hard for me, cause I don't cry, but when I do I lose it. So they made me come back and we finished that piece. There were like 3 or 4 people helping me. So I call it my spirit vase, I kept it for myself and I had started it for my mom and I feel bad about keeping it, but everybody contributed to get that piece done for me, I call it my spirit vase. Those are the special times in glass. And Benji has always told me, I keep in contact with Benji a lot, he says, 'if you haven't had a breakdown, you're not a true artist.'[62]

[62] Ibid.

Image 25: The 'Spirit Vase.'

The breakdown. When questioned as to what the most important factor of a successful design/build process in his shop is, Ken Horne's answer is quick, "Professor Bentz taught me early on that the project has to be theirs, and they have to have suffered, if they didn't suffer, well, [they] got another project done, and they'll just treat it like an art history paper, finishing it just to get the B plus." For a student to invest, give him or herself freely, and truly reap the rewards of a design process, Horne believes this suffering is essential, but can't be overwhelming. "A former Industrial Design professor has said that the perfect project is one that takes [the student] beyond what they could imagine doing, and yet they succeed. If it's beyond and they fail, then it's horrible. One or two people fail, you sacrifice them a little bit, but they can see that other people did it, it's not impossible, they just took a risk and it didn't work out. But if everyone does poorly, or it just doesn't work out, you have not only wasted six weeks, but you've ruined a lot of confidence, and taken away the whole concept of working really hard and doing better than you thought you could have."[63]

Ken Horne is the Workshop Technician in the Industrial Design Studio at the University of Alberta. He has worked in this position for 16 years assisting students with the hands on application of design ideas and concepts in the physical construction of furniture and products. Watching Horne work, it is clear to see that he fully embraces the concept of touching, manipulating and wrecking materials in order to fully understand potentials. His belief in the necessity of letting a student 'ruin some wood' stems from his personal ethos of design learning: 'with a chisel in your hand.'

Self-conscious practice arises within even the most highly skilled practitioner, as the context within which Ken works in the University shop proves to affect his making process. Being surrounded by a body of students and faculty

[63] Ken Horne in discussion with the author.

who expect a certain level of skill from you can inhibit, rather than improve one's capacity to make in a confident manner. He speaks about how creating the graphic applications for the bottom of long boards are purely enjoyable. "I'm not an artist, I can't be criticized for doing poor art. (...) We are the biggest bunch of critics out there."[64] Self-conscious work debilitates the means to make intuitively. As a strategy to foster inhibitive thought within students, instructors must assert criticality that does not evoke judgment or expectation.

For Horne, making is a full body experience, incorporating all the senses. Surprisingly, sound is one of the most important indicators of how tooling is affecting material, "I hear bad things way before they happen, I can hear a catastrophe way before I see it, you have to be looking to see the catastrophe, where as I can hear it across the room."[65] In a story of when he was first learning, he discusses how revelatory the realization that complete sensorial commitment to his process would allow him to learn from his work in action.

> "The first time I was working with XXX I was making a little pot with a lid on it, and I screwed up. I went too thin and it broke into two pieces. And he was all mad at me cause I wasted the time and wasted the wood. 'You can hear! I mean listen, you can hear the change in tone, ears alone should provide you the information you need' 'Yeah I guess if I had done a lot...' and he's like 'No! I don't need this bullshit excuse, just do it and pay attention,' and it was one of those really great moments because I didn't have any rookie excuses, he wasn't interested in any of that crap, he was just disappointed cause I wasn't paying attention, and it was like 'yes' that is why I love doing this thing, cause it is talking to you all the time.[66]

This dialogue that occurs between Horne, the tool and the material, is his reason for making. In contrast, he discusses the process of CNCing[67] as a series of monologues, rather than a reciprocal relationship. "I can't connect [with this series of monologues], I can't find enough energy to do it. This dialogue (...) is the reward. (...) This gives me energy where as the [CNC]

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[64] Ibid.

[65] Ibid.

[66] Ibid.

[67] In this instance, a CNC is a multi-axis Computer Numerical Control router that takes computer drafted files and cuts them out of specified material.

takes energy from me." The energy exchange then, creates a narrative within the piece made. As he turns the wood he is aware that he is making marks that have meaning, and can speak louder than the piece itself. These marks speak just as loud to the user as they do the maker. After completing the wood bowl he was not particularly proud of Horne talks about the dialogue in his piece. "This whole time this [piece of wood] was talking to me, saying 'you horrible amateur, quit cutting into me today, like what are you doing' (...) 'show some respect.' And it's a story going on, and all the scars in that piece will tell the story, the clumsiness of the lines, and the rather heaviness of it. (...) It's not what I wanted to express, but it's the truth. And that's something."[68] The honest marks are not only useful after the piece is completed, but more importantly create checkpoints for a reflective practice.

Like design, Horne stands to state, "I think that you should be able to tell something about someone by their collection of craft." Care and commitment in craftwork, similar to art, should make evident the tale of the maker, intentionality, point of view, time and commitment. He tells a story of a craftsman he met recently selling his work at a market, and speaks to the quality of work that the wood turner presented. "I was on Salt Spring Island a couple weeks ago, and (...) this guy is selling these quite large things chalked full of this torn grain, and it bothered me that, and it's just a craftsmanship issue, he just set his standards way too low. You're at a craft market and you're selling things for a premium because of that contact, that interaction. (...) It was just, 'I know you can do better,' it's just a time thing, and caring and learning. You need to sharpen your tools better, and make that commitment."[69] It seems that in today's age, we associate craft with an obvious hand technique, marks that are visible, untidy. Spontaneity in craftsmanship has been confused with quickness, and we have "lost some of our ability to recognize the aesthetics of informed spontaneity."[70] It is important that craft is looked upon as a skilled, rather than a homely, or

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[68] In discussion with the author.

[69] Ken Horne in discussion with the author.

[70] Dormer, *Art of the Maker*, 96.

rough way of making. While improvisational, a true craftsperson understands that the labour of perfecting one's technique is imperative, and that it is a carefully considered gestural act. Viewers should therefore be educated in the hand's possibilities, not given easily digestible 'homemade' products.

Image 26: Kenny on his Lathe.

Image 27: Tool Selection, the beginning of essential decisions.

Image 28: Light touch and ease of pressure on guide as Kenny begins to tool the outer edge of his bowl.

Image 29: Guide adjustment to work from outside to inside to outside of the forming bowl.

Ken references Rodney Mullen, the professional skateboarder, who discusses how we are able to embody an assemblage of multiple movements in action that can be put together in any set or fashion, steps within a walk.[71] These muscle memories provide the groundwork for creativity. One must simply be open enough to engage in something unknown to allow for these embodied steps to reveal themselves in a pattern that will maneuver the actor through the task at hand, be it the movements of a skateboard trick, or the tooled finishing on a turned bowl.

"This is a commitment tool (gouge) where as this is a sketching and erasing tool (scraper being sketching, sanding being erasing),"[72] Horne states, pointing out the differences in ways of engaging with the wood. He emphasizes the natural engagement of gesture, using intentional movement when you work, not small interventions and adjustments. The sketching-erasing technique imposes upon the material rather than working with the nature of the part, or problem.

While discussing craft and care within the work, Horne is all the while turning a wooden bowl, continually upset with himself. He hasn't lathed for sometime and he can tell, his muscle memory is gone. But his piece, though imperfect and never something he would sell, still has much meaning and purpose within it. His turning is shaky, but he continues with the intentions of re-learning what used to be second nature. There is never a time when Horne abandons the spinning mass of wood before him. "I'm not feeling too proud at the moment," he admitted, working hard to allow his bowl to take shape. "But no, I wouldn't throw this piece away, each piece can be learned from. You just keep going, and it gets smaller and smaller, but you would never throw it away."[73]

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[71] Ingold, *Being Alive*, 59.

[72] Ken Horne in discussion with the author.

[73] Ibid.

The generative nature of Horne's working, and more specifically his lathe work, is apparent from the very beginning; he rarely begins with a pre-conceived drawing. "I almost never work from a sketch, more than anything I sketch ideas, and I'll look at things and just draw them out. With turning it's a quick thing, it's a one off, so you're really allowed to play. You are given a few constants to work with, the size of the block, the tooling at hand, and whatever sense of proportion you possess. You do whatever strikes you, most of it is determined by what's in your head, you make a mistake and then it's 'well now this is what I have' which is completely different, and you just work with it."[74]

Image 30: The bowl begins to take shape, though not that which was originally intended.

Image 31: Kenny removes his tool to step back and assess. He considers his tool marks, and determines how to move forward from his decisions he has made.

Dialogue, generative process, and a recognition of the multi-sensorial awareness required for handwork all contribute to Horne's perspective on liberal arts education, and how one should learn within the university institution. "I think if I was in charge I would simplify things. (...)You can learn everything you need to learn about technology later. (...) The world, to some degree is awakening to the fact that we're missing the basics, and I think we need to begin at the basics. We need to experience physics, sit on a chair and wobble till it breaks, and go 'holy cow, this actually does need structure.' Maybe those unbelievably rendered chairs in the magazine are like the boobs on the Cosmo girl, they're not real you know? (...) I think you need to learn yourself, and then to express yourself, and find out what you think is important in the world. And the strange, ironic part is I think you learn that with a chisel in

[74] Ibid.

your hand, I honestly do. (...) bashing raw materials, banging up some metal, going into the welding booth and torching up an oxyacetylene torch. (...) that act of creating, changing raw materials. People these days, they see everything as a finished product, they go to IKEA and see all these finished products, they go to Dollarama and see all these cool things right? I look at everything as raw materials, and that's just a mind issue, it's not a physical skill issue, that's just a way to think. And that's what I think design school should do. And I think it's more important to allow people to experience and build and break things and get in the shop and be goofy and be free and have fun."[75] He concedes that such skills may not explicitly align with a technical job placement, and won't equip students with specific skills that can be applied in an overtly obvious manner to a particular occupation, but to learn to think for one's self, to learn to question, such self-forming characteristics are what a university education should be facilitating.

Image 32: Using touch, Kenny is able to feel imperfections, marks too fine to be seen with the eye.

And though seemingly backward thinking, in this sense, a rudimentary way of working can create what is a truly philosophical mind. "I think that we aren't here to create tradesmen, we're here to create philosophers, and we're here to create understanding of yourself to begin with. [What exemplifies this is] Professor Antoniuk's final project in furniture, a personal project where you get to just make your own piece of furniture based on what you think.[76] And to me it's this beautiful conclusion of four years of university where you get to define who you are, what you think is important and express it in a piece of design." This expression of self through making may just be what design education is about. "And humbly in the back of my mind I think: 'they're all tradesmen

[75] Ibid.

[76] Professor (Tim) Antoniuk is a current professor at the University of Alberta in the Department of Industrial Design.

and I'm the philosopher."[77] The expression of self through making may just be what design education is about.

The Practitioner: Marc

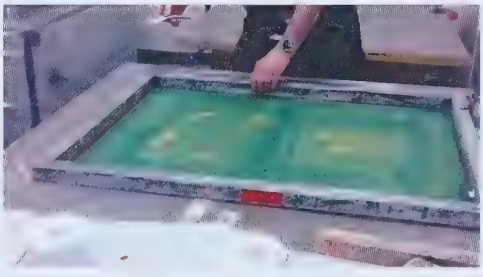
Image 33: Marc at work in the University of Alberta Studio.

"Cool, I think I like it," are the first words Marc utters as he layers another

[77] Ibid.

coat of screen print on top of his work.[78] The feeling of slight uncertainty as to how his next mark was going to meld with the piece is evident. As Marc works, it is clear he embraces the stepped process of printmaking, recognizing that the piece will change at each decision, and accepting the possibilities of the unexpected.

Marc Siegner is a technician working in the printmaking studio at the University of Alberta. As well as being a resource to students learning printmaking techniques, he continues his practice as an active printmaker, utilizing the studio space for his own work as well. It is here that I was able to observe the way he acts within a space that is constantly cohabitated by students and other faculty members.



Images 34, 35 & 36: Marc placing a screen to attempt to replicate a mark in screen print, Inking the screen, then assessing the marks made, and adjusting placement, and depth for the next print.

He has recently travelled to Beijing for research, and while discussing the experience as "not quite as planned", he explains how this proved to indeed be positive. "I came to the conclusion that a lot of it's a pretext, and a pretext is just a making of work, and to discover through making. So you may have a plan, but it's nice to be able to go with stuff that happens, and that's really the sweetness, being open to stuff that happens and not being so focused on the plan."[79] While he asserts that a plan is necessary to get to the beginning, the true magic is in the allowing of what is to be to be. The statement seems a flippant one, that

[78] Marc Siegner (Printmaking Technician at the University of Alberta) in discussion with the author.

[79] Ibid.

anyone can simply then begin a similar journey and see where it leads. But it requires a true understanding of oneself and one's way of working, the possibilities of a craft and continual observation and reflection to recognize the opportunities in a process such as this. To teach these ways of openness and improvisation is difficult, but necessary in an academic setting to foster individual thought and awareness. It is not through the transmission of instruction that skills are learned, "but rather through a mixture of improvisation and imitation in the setting of practice."[80]

In order to facilitate what can be a steep learning curve, Seigner contends that students learn best through the most rudimentary means, with their hands. "Simple is best, keep it simple and [the students] will learn a lot from that. The more complicated you make it initially, the more they kinda get mixed up with it. There's so much to be learned by doing the hands-on, that I think you should just keep the materials and the approach really simple and let them go through the hands-on in a few projects."[81] Beginning with minimal techniques in an arsenal, students are able to master the basics, and build upon them as their concepts require. They are not overwhelmed or burdened with an abundance of new knowledge and an uncertainty with how to apply it. Rather these students are given the tools to begin the process, and the ability to seek out, or experiment through their work in order to see what the medium is capable of beyond.

Image 37: Warhol's Portrait of Gretzky by Marc Seigner.

[80] Tim Ingold, *The Perception of the Environment: Essays in Livelihood, Dwelling, and Skill.* (London and New York: Routledge, 2000) 401.

[81] Marc Seigner in discussion with the author,

As Marc works, he is relating stories of where his decisions in mark making originated. Lively narratives of noodle makers, tailors and his rogue translator 'Tiger' stem from what are becoming annual trips to China, and explain photographs and layered images in his work. As an observer of Marc making, these stories are intriguing, but to Marc they seem to indicate reasons for why certain marks were made and how he proceeds with his pieces.

I watched as Marc worked to replicate a copy of an original piece he had created with charcoal and pencil crayon through screen printing. While he had tangible visions of where he hoped the piece would go, he was also considerate of the different medium, and the effects that would simply not be possible in ink. "So it's been up and down, I really liked what was going on then I reached a certain point when I didn't like what was going on then I just kept going. This is the first time I've tried to make a close facsimile to the original."[82]

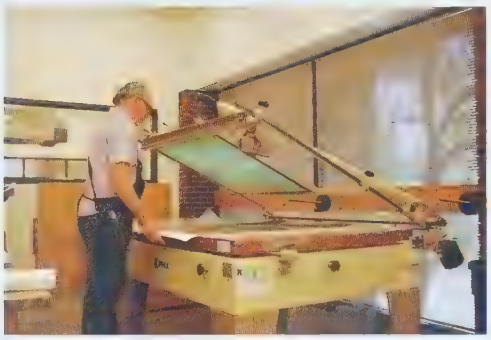
In what one may consider a trial-and-error practice, the point at which printmakers are able to stop and commence from the beginning arises continually. "I try to make it work," said Marc, describing the moments of consideration before moving forward, "but there was this one point where I could just not consciously continue, you know?" He also explains some of the unforeseen results that he has embraced, "Like the opacities of these colours here, (...) they're not quite as opaque but I managed to get them fairly opaque, so that was unexpected but I thought I'd just go with it."

These 'checkpoints' that the process of printmaking lends itself to are an explicit call for reflection-in-action within art making, and can be necessary induced pauses, especially for a novice printer. Whether digital or analogue, an artist can assess the work multiple times, before the final piece is done, as the methods used often (and prominently in Marc's work) contain single

[82] Ibid.

actions that are considered, carried out and reflected upon. These points of reference are important both aesthetically, but also technically, something that Siegner says he wishes would occur more between himself and the students. He voices the necessity for time in order to "actually periodically review those things, that's something I don't get enough time to do. (...) if I was teaching it I'd teach it that way, with some of the review in place, so we'd go over not just the aesthetic, but the technical side of things."

Such technical skill does not hold the same weight as the overall end aesthetic in many liberal arts based programs. Often times, if the final outcome bears an aesthetic that is pleasing, moving, or conceptually sound, the technical merit of the piece is inconsequential. This can be frustrating for a technician, though Siegner says that it's simply the way it is. "I know there's an unofficial prerogative here, or a mandate maybe, to look at the aesthetic as the overall justification. If it yields a good result, then doesn't matter if you don't learn the skills."[83] But a large factor in this way of teaching is the way in which a program is organized. In an attempt to introduce students to small portions of multiple techniques, they aren't exposed to the full breadth of a single method. "We don't give them a lot of in depth (training)," he stated, noting that he was able to undertake a single technique (lithography) for his full 4-year undergraduate education.



Images 38 & 39: Marc printing works that 'became' on a trip to Beijing.

[83] Ibid.

Engagement: To Tap

After 3 months of continued practice, I finally today mastered the step. My 'mastery' refers to the fact that I have managed to remove my conscious from it, I am no longer thinking about where to place my next shuffle or how to extract the proper tap sound from my heel, I look into the mirror and am able to disconnect my gaze from my feet and rather, I am able to look into my own eyes. I have somehow managed to embody the step, through constant repetition, learning and unlearning, and observation.

Now I am able to see the floor, consider my arms (something that I had forgotten existed), and think of what it is that needs to follow. How can this step flow into the next? It has become obvious to me, that the embodiment of dance knowledge is necessary to be a successful performer. One cannot constantly be thinking of what is the subsequent move, when you are thinking that much you are no longer feeling. And the feeling of dance is what makes this act alive for me, a release of sorts.

Acquiring such knowledge laid the foundation of what was to come. I needed to understand what my feet were capable of doing, and how to control them in ways they weren't used to being controlled before I could push them to do more difficult tasks. And while my end goal seemed to be the removal of thought from the activity, the process of learning to do so was forcing me to think in ways I had never before experienced. By the end of a one hour lesson I was mentally exhausted from reciting step sequences in my head, and forcing the words to translate into cohesive movements. The divorce that was occurring between the physical and verbal languages that I was employing made the process even more difficult, and it became apparent that while it was necessary to begin in a cognitive language, it was the motions that were teaching me more. I could not sit down and simply visualize the steps as a way of learning, I was forced to put on my tap shoes, stand in my basement apartment and perform the steps again and again. Repeat, repeat, repeat.

Images 40, 41 & 42: Sequential tap steps that became embodied. Foundational steps from which to pull for more complex combinations.

PART 4:
Case Studies: Collaboration in Learning Through Doing

"Interdisciplinarity consists of creating a new object that belongs to no one."

-Roland Barthes, *Jeunes Chercheurs*, 1972.

Multi-Disciplinary Collaboration

Multi-disciplinary collaboration has become a practiced way of creating new knowledges and generating innovative ideas that take into account many ideas, opinions, and ways of thinking. But the mediation of such circumstances requires consideration, and concrete understanding of differing perspectives and interests held within a common problem. "Engaging with people that have different ways of knowing an doing involves a transformation of self.[84] There are a clear set of skills required to engage with differing knowledges in a collaborative setting, and especially when including those who are not normally part of such a design process.

Donovan and Gunn discuss the importance of considering unconventional strengths of participants in a collaborative setting: "During processes and practices of designing the challenge for involving people who would otherwise be excluded, is to design in such a way that acknowledges perceptual acuity and improvisational skills of people."[85] Scenarios must be organized to facilitate people's willingness to engage in an open and freethinking way. This cross-collaborative, innovation seeking methodology is one that is largely utilized at SPIRE.

The SPIRE Method: User-centered and participatory design collaboration as a model for knowledge creation

As a visiting researcher at the SPIRE research centre in Sonderborg, Denmark, I was allowed access into the inner workings of the activities,

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[84] Donovan and Gunn, *Design Anthropology*, 1.

[85] Ibid, 4.

workshops and engagements that SPIRE constructs in order to bring together dissimilar knowledge backgrounds to solve complex problems. Such stakeholders often include private companies and industrial entities, the public sector, local communities, designers and academics. Here, "Emphasis is placed on how things come into being as opposed to focusing on the objects of design."[86] By bringing dissimilar thought processes and interests together,

Linux is an open-source software that completely exemplifies the idea of collaborative craft work. "The Linux system is public craft."[87] The software creates an "open relation between problem solving and problem finding (...) [and] builds and expands skills." The system is set up to discover problems, making issues obvious so that contributors can continually work to address them.[88] Open source software serves as a good metaphor for what it is that SPIRE seeks to achieve through its collaborative workshops, charrettes, and multiple stakeholder design engagements. By using provocative strategies that are able to make issues explicit to participants, SPIRE's methods address problems that are not always obvious, while creating a platform for open contribution towards a solution.

By using accessible workshops and activities, all stakeholders involved in the design process are brought into the collaboration on the same playing field. Often 'provotypes' are used (prototypes created in order to provoke though, question, inquiry) which are meant to engage the participants to openly respond in a making based way that allows them to reframe the design problem at hand.

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[86] Ibid.

[87] Richard Sennett, Sennett, *The Craftsman*, (New Haven, CT: Yale University Press, 2008), 24.

[88] Sennett, *The Craftsman*, 38.

> Within such practices, materials play a central role in helping people to imagine and engage with the social and processual aspects of how things come into being. There is of course friction and constraints in the fluidity but that is where improvisation takes a role.[89]

The way that SPIRE uses materials and the making process as a way to engage disparate disciplines and ways of thinking in working through design problems can be assumed as a testament to the common language that occurs through the hand, and an illustration of the conversations and learning that can occur through making. As a way of 'drawing things together', participants are able to "[work] out ways of bringing gestural movements of designing and using closer together."[90] By taking such a generative approach to design and innovation, SPIRE looks to innovate, looking forward rather than regenerating from previous acts.

Reiterating past processes can be a problem that many practitioners get preoccupied with. Aina Landsverk Hagen, a social anthropologist and scientist at the Work Research Institute in Oslo, Norway, worked with Snohetta, the Norweigen architecture firm to better understand and facilitate idea generation and use in organizations. She discusses how the firm, rather than learning from, and building upon, their previous processes, would start each project in the same way. "The firm starts 'seemingly anew' every time they begin a project, but in reality, the process is very much reproducing what they've done before, because they're 'starting afresh', rather than moving forward from what they had done before. Therefore it's not new, it's just reiterative of their previous processes."[91] To truly develop creatively and work to engage new ways of thinking, a designer must rather gather all available knowledge that has been cultivated in order to move forward. No process should begin without a foundation; like the skilled craftsman's

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[89] Ingold and Hallam qtd in Donovan and Gunn, *Design Anthropology*, 5.

[90] Donovan and Gunn, *Design Anthropology*, 4.

[91] Aina Landsverk in discussion with the author.

work, it should generate from all previously embodied research and knowledge from past making or doing.[92]

A final factor for the creation of a space to improve open discourse in such an improvisational manner are the colliding contexts occurring within the activity, and how these are incorporated with the provocations designed by SPIRE. SPIRE often uses personal narrative within their collaborative workshops in order to understand stakeholder's external interests, and how these can affect the design outcome of the activity. "You can design in a workshop, you can design in an interview," Jacob Buur stated, when discussing how such design ideas come to be.[93] By probing participants in a way that seeks to evoke their deeper needs and their reasonings, collaborative design can successfully incorporate stakeholders that are not usually included in such processes, and will bring in information to idea generation activities not possible in a purely designer centered exchange.

Extracting Tacit Knowledge: The Relevance of Apprenticeship

Tacit knowledge is the embodied thought, insight, and intuition. Often subjective, such knowledge is usually individual and hard to extract, and involves personal experience, context and narrative that cannot be gained from written explanation. The knowledge that is contained within the practitioner then, is often unable to be written, or even spoken about accurately. When one undertakes the process of acquiring physical skill or craft expertise, it can often be difficult to find adequate literature or documentation to describe such processes. This often occurs through the act of apprenticeship, working alongside a master to

[92] Ingold et al as qtd in Donovan and Gunn, *Design Anthropology*, 5.

[93] Jacob Buur in discussion with the author.

obtain techniques that are easier learnt through doing than through listening.

The management, transfer and creation of knowledge is a research area that has interest in realms far outside of the educational institution. The corporate world has long been interested in ways to generate knowledge, with keen interest on the ways in which tacit and explicit knowledges can be transferred and changed from one to another for employee appropriation.[94] In 1991, Ikujiro Nonaka wrote an article that popularized the notion of 'tacit' knowledge, and the value that is carried in the subjective notions and ideas that are carried, hidden away within oneself.[95] The premise of this article, and what became its most important product, was that such tacit knowledge is a vital resource in the creation of new knowledge within a company, and that the extraction of such knowledge is therefore an essential process to understand.[96] The process, understood as SECI[97], was a spiral system that discussed the ways to manage knowledge through socialization, externalization, combination and internalization. The four steps worked at transferring knowledge between tacit and explicit forms, and acknowledged the importance of using tacit knowledge within a successful business model.

To extract such tacit knowledge, Nonaka explains that it must be first passed tacitly (through socialization) to then be made explicit by the recipient. Apprenticeship works to pass tacit knowledge from expert to

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[94] Similarly, PAR, or Participatory Action Research, has origins in the workplace as a way to facilitate responsible participation that promotes critical self-inquiry and collaborative work (Kurt Lewin, (1946) *Action Research and Minority Problems*, Journal of Social Issues, 2, no 4 (1946): 34–46.)

[95] Ikujiro Nonaka, *The Knowledg-Creating Company* (Boston, Mass: Harvard Business Press, 2008), 1.

[96] Nonaka, *Knowledge-Creating Company*, 7.

[97] *SECI* is the theory of organizational knowledge creation signifying four modes of knowledge conversion, Socialization, Externalization, Combination and Internalization

novice, and as the novice learns, they then are able to articulate what they have gained, which could only have been gained through a tacit to tacit experience. This apprenticeship is essential, and repetitive, but does not mean that the learner is not also making decisions and improvisations, these decisions are necessary to solidify the new knowledge within the novice practitioner.

> Novices learn through repetitive practice in which they are required to copy exemplars shown to them. This is not, however, like running off identical copies from a template. It is not an iteration. To copy from a master means aligning observation of the master's performance with actions in a world that is itself suspended on movement. And this alignment calls for a good measure of creative improvisation. There is creativity, therefore, even (and perhaps especially) in the maintenance of an established tradition.[98]

An instructor understanding the importance of such improvisation in how a student learns can prove to be the difference between simply teaching a skill, and imparting knowledge with intentions of teaching to think. Emphasis on the "lessons of experience through a dialogue between tacit knowledge and explicit critique"[99] provide a basis for which this learning can take place.

Further expansion into the traditional apprenticeship relationship also reveals ideas of communities in making. The workshop itself can bring people together in a master/apprentice social dynamic. Traditionally these communities were how quality and ethical understandings were preserved and passed on, while fostering creativity within the collaborative setting. With the Renaissance separation of art and craft, these workshop communes were replaced with an emphasis on the individual. A return to such a way of collaborative making provides the opportunity for a revisit to community ideals that serve to challenge

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[98] Ingold, *Being Alive*, 179.

[99] Sennett, *Craftsman*, 51.

and foster their members in a way that enriches the ideals of craft and the direct transfer of tacit knowledges.

Design Education: Learning Through Doing and the Importance of Improvisation

The educational institution is considered a place to nurture thought as well as teach new knowledge, but these two ideas are frequently considered mutually exclusive in the learning environment. Technical colleges can be solely concerned with how to teach a skill, strict information being passed from teacher to student. Dissimilarly, the institution of the university tends to take advantage of a learning environment to allow students to question, and grow, but often divorces this from the practical act. Students are taught, to wonder and research at a level that is 'raised' above that of actual engagement. What if such learning and self-reflection occurred directly through the act of doing, how could physical engagement actually benefit a cerebral-centric education? Josef Albers has said, "The best education is one's own experience."[100] Experience of practical situations that involve action, reaction, and constant consideration of context, culture and other external factors create circumstances that foster critical thought.

A skilled practitioner makes, not to impose form, but so to relate or engage with elements of an environment in a certain way. "Thus, meanings are discovered, coming out of this particular kind of engagement."[101] Such possibilities then, are available to students who, although not experts, can utilize the making process as a way to understand materiality and the ways in which personal discovery can be achieved through process involving both head and hand thinking. By

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[100] Josef Albers, *Skilled Learning by Doing: Teaching Modern Craft Thinking in Situations,* in Thinking Through Craft, ed. G. Adamson (Oxford; New York: Bert, 2007), 84.

[101] Gunn, *Learning Within Workplaces,* 108.

embracing the journey, students come to realize that "Experimenting surpasses studying."[102]

"The nearest kind of association is not mere perceptual cognition, but rather a handling, using and taking care of things which has its own kind of 'knowledge'."[103] The educational institution has moved away from a teaching strategy that involves the hand and physical engagement. Society has separated hand and head thinking into distinct actors evidenced by the separation of institutions of vocational and academic learning. But this separation introduces a new set of concerns. What becomes of those disciplines that do not fall squarely into one institution category or the other (or even more problematically, what happens to those that are superficially assumed)?

Design pedagogy often falls into this category of ambiguous study, both academic and vocational. While it is widely understood that design education is meant to introduce new ways of thinking, critical analysis skills, and the ability to solve problems (that to many would not even considered as such), the way that these skills are taught is not clearly defined. There are physical skills that are required in the world, skills that are employable, skills that are quantifiable, easily explained in a resume. "Set a kid in front of a computer and teach him the skills that he's gonna need to make a living out in the world. I get it, but I think it's wrong," Ken Horne argued when asked what he felt the problem was with current design education. He describes drafting as a skill that can be obtained with little critical thought, a trade of sorts. "I think anyone can learn how to draw a building in AutoCAD. Not everyone is an architect."[104] If it's inquisitive thought then, that a university level

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[102] Albers, *Thinking Through Craft*, 84.

[103] Martin Heidegger qtd. in Crawford, *Case for Working*, 68-9.

[104] Ken Horne in discussion with the author.

academic institution is meant to impart on students, how is this achieved, and how is success evaluated?

> Learning and teaching in institutions where productivity and success is dependant on an audit culture focusing on targets, outputs, accountability and standardization of criteria upon which departments can be judged, is there a danger in borrowing methods and systems of representation from one form into another, considering what is of value in one knowledge tradition may not have value in another?[105]

The system of grading is an issue regarding how students utilize their time in an academic institution. Ken Horne explains that the marking convention used in universities is the overarching difference between his relationship as a technician with students as apposed to how students and professors relate. Marks "put a ridiculous pressure on the relationship between a professor and a student. Because there are marks it means you can't tell the truth, you somehow have to sugarcoat things, and you have different motivations. Students are desperate to find out what the prof wants so that they can get a good mark, and I mean, that can't be part of the equation." By not being in the position to grade a student, Horne is able to discuss very specific aspects of making as well as broader topics that sometimes just bring a design project into perspective. "I can talk about things that are beyond the scope of the project because I am more concerned with you learning what the hell you're doing and why you're doing it, even if it won't increase your mark. But I can also be much more specific, because often it's a specific trouble that I am trying to solve, 'how do I do that specific technical task,' it's concrete."[106]

To embrace the way that practitioners work, and in a sense, their improvisational methods, design pedagogy should be allowed to exploit instances of learning not available in a traditionally linear educational

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[105] Wendy Gunn, *Learning Within Workplaces*, 121.
[106] Ken Horne in discussion with the author.

organization. By exploiting the ideas of creativity as part of the improvisational process, students must step back as a master designer, and understand that much (or most) of what contributes to the final product are the improvisational decisions embedded in the building process, and the processes that are imposed on the product thereafter by the users themselves: "The idea is crystalline, the fact is fluid."[107] To inhabit this space of fluidity and flux in generative building would place students in a situation that instigates critical thought in response to contextual forces and material characteristics. Improvisational generative production then, can become a way of teaching design in an organic manner not allowed in a CAD[108] program. By regarding materials as being in flux, it is understood that "matter-flow can only be followed," and not imposed upon.[109]

> Paul Klee repeatedly insisted that the processes of genesis and growth that give rise to forms in the world we inhabit are more important than the forms themselves. 'Form is the end, death', he wrote. 'Form-giving is life.'[110]

The concept of form-giving as holding primacy over the end result is a difficult case to make in a world based on commoditization and capital, but I argue that working through the physical engagement of material is essential for the personal growth and exploration necessary for a designer to learn ways of design-understanding and to be what most would consider a designer to be: an expert problem solver. Where Cross considers a designer's activity as selecting the most satisfactory solution, rather than the most optimal, a focus on design through the generative process can result in a more holistic researched approach,

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[107] Stewart Brand qtd in Tim Ingold and Elizabeth Hallam, *Creativity and Cultural Improvisation: An Introduction*, in Creativity and Cultural Improvisation, ed. E. Hallam and T. Ingold (Oxford; New York: Berg, 2007), 4.

[108] CAD: Computer Aided Design

[109] Deleuze and Guattari qtd. in Ingold, *Being Alive*, 213

[110] Klee qtd in Ingold, *Being Alive*, 210

and potentially a more successful solution.[111] Separation and specialization of tasks within a making setting brings about questions of ends and means within design and production in a learning environment. The way a designer considers throughout a production process has an affect on thought and learning outcomes. A purely result based ideal of design minimizes the importance of the journey, and most importantly, as Gunn has discussed, "What happens to forms of knowledge that cannot be written down?"[112]

A focus on generative making though, should not eradicate the need for reflection. While Ingold argues that "retrospective looking back results in descriptions of innovation which look at previous acts and that differ from the lived actuality of people(s) generating forms," this does not mean that reflecting in action can not be part of the forward movement of fluid form making.[113] Rather, by understanding the importance for students to reflect on improvisational decisions, they can come to better understand their process in the act, where their creativity has been formed, and learn from decisions that can be made in a seemingly intuitive manner.

Practice in Paperwork: The PaperProject

As a way to understand how students can work and learn collaboratively through the physical language of making, I designed and orchestrated a workshop that utilized paper as a way to explore these opportunities. Students were split into two groups, one group given 45 minutes to brainstorm, sketch and engage with provided paper

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[111] Nigel Cross, *Designerly Ways of Knowing*, Design Studies 3, no. 1 (1982): 224.

[112] Gunn, *Learning Within Workplaces*, 121.

[113] Donovan and Gunn, *Design Anthropology*, 5.

in order to create a form of vessel for a specific purpose (determined by the designer themselves), the other sat with me and learned different manipulation techniques and building strategies that could be employed in the making of a vessel. Rather than applying language as the primary conveyance of meaning, students watched as I performed techniques, mimicking my actions in an apprentice style learning method.

Image 43: 'Doing' with the students as a way to teach the skilled techniques.

Often when verbal language is utilized as the sole means of teaching, it creates at the same time "ambiguities of meaning and a basis for controlling learners"[114] Confusion occurs because of the explicit delivery of instruction as students struggle to perpetuate the expected results. This pedagogical method assumes that the classroom is a decontextualized space, and ignores external influences as being relevant learning contributors within the environment. In actuality the classroom is full of peripheral factors, both personal to the students, and those of an overarching institution. Open ended, making based educational methods that place the educator alongside the student can embrace learner's personal milieu, and push them to recognize the institutional structure of the classroom and how this context influences their thought and idea production.

In bringing the students together to engage in a collaborative making process using the ideas generated from the 'designers' and crafting skills of the 'skilled workers' it was essential that they created an organized partnership that utilized both knowledges, and recognized

[114] Jean Lave, *The Practice of Learning*, in Understanding Practice: Perspectives on Activity and Context, ed. S. Chaiklin and J. Lave (Cambridge: Cambridge University Press, 1996), 25.

that their interactions needed to incorporate the making process as a means of production.

"Being someone who does not know is central to learning something of another's world."[115] In partnerships that did not yield the most successful results, it was often due to the fact that one participant did not allow themselves to learn from the other. Paper as a crafting material was, to some, not a new medium, and students who engaged in the activity on their own, assuming their previous knowledge was sufficient to complete the design task, tended to lack the willingness to engage and share with their partner. This was similar in the reciprocal fashion, as those paired with someone who was seemingly an expert were less likely to confide in and share ideas. Ken Horne noted that often practitioners are more comfortable getting input and opinions from those who don't know. "People just sometimes want to bounce ideas off of someone who doesn't know anything," he added, a fact that I related to in my observations of practitioners at work and their willingness to confide in me and request critique in areas unfamiliar to me.[116] The products of these pairings were often one-sided, and while the vessel itself was not always unsuccessful or unaesthetic, the learning experience of those involved was significantly mired.

The collaborations that proved to be the most beneficial to both parties were ones that utilized past knowledge, narrative and external thought within the making process. Differently than simply conveying previous understandings of the medium and blanketing them atop the problem, these students were able to recall past experiences, share them with their partner and integrate these ideas into the collaborated effort. The storylines and histories made the teaching of a specific technique or design idea richer and easier to grasp for the other student, and became

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[115] Student Flip van den Berg qtd. in Gunn, *Learning to Ask*, 328.

[116] In discussion with the author.

a catalyst for further ideas to build off. Often groups who had a story to go along with their concepts were simply more excited about what they produced, and were more confident and willing to share their ideas. Utilizing personal anecdotes proved to be an accessible way for the implicit knowledges of the making process and paper working techniques to be passed between the collaborating students. "Tracing paths, telling stories, making things and weaving narratives are central to sharing knowledge across disciplines."[117]

Images 44 & 45: While sketches formed some initial ideas, the end vessels took on lives of their own as partners combined new ideas together while working with the paper.

These personal contributions to the activity created a social context within which the act of making was situated. And while this workshop was constructed in a sterile, and institutionally academic environment, it was clear that this physical space too affected the way in which the activities were undertaken, and how the participants felt, acted, and worked together. "There is no decontextualized social practice."[118] Classroom teaching, which is often considered to be 'decontextualized learning' can rather be explained as contextualized social practice. Students acted in a manner that is typically expected of an academic institution. Seated quietly at

[117] Gunn, *Learning to Ask*, 329.

[118] Lave, *Practice of Learning*, 22.

desks, collaboration was done solemnly and in such a manner that one would write a multiple-choice test. Participants did not stand on desks to combine larger paper techniques, engage in other people's paired groups, or break any of the 'rules' that are informed in this context. Many of the techniques learned were utilized, or forced into designs in which a more free and creative approach could have been more suitable.

Image 46: A 'designer' student's initial ideas for vessels to be made with the paper.

Throughout the design process, and at the completion of the workshop the students were asked to describe what they had done. These checkpoints were meant as points of self-reflection, but also to reveal some of the underlying considerations that non-designers give to a designerly problem. Process issues arose between the partners, and students had to mediate amongst themselves to determine how to tackle the task at hand in a limited amount of time.

Image 47: Students showing techniques learned to their partner through the medium.

In the paper workshops, students who had never before been exposed to collaborative making were able to learn about one another in two hours, more than they would have understood of their personal process and idea generation in a complete term. Often students are taught into a certain design process, and this exposure allowed them to explore other ideas, and learn design thinking

and critical analysis through the process of making and engagement.

"[It was] a lot of trial and error, literally some round ideas came from him, and some folding, sharp ideas from me," explained one student when discussing how the final product, a bowl for soup that also allowed the user to sip from one edge, came to be combining both partner's concepts. "We didn't really talk much, but for some reason we kind of knew where we were going but we didn't really know how it would end up, but here it is."[119] The pair used the materials given to sort out their ideas. Rather than incorporate preconceived concepts that had been considered in the design phase, both students took to the paper and began experimenting with techniques, teaching silently while folding together.

The design phase for the 'designer' half of the partnership proved to utilize the material much more than traditional drawing and sketching. With the introduction of a material that was somewhat unfamiliar in a construction sense, many students felt that they needed to work hands-on with the paper to understand what it was capable of, and how it would react structurally in different design scenarios. "I found it really hard to sketch in general, because as soon as I touched the paper I was like 'oh what am I going to do' so I kinda had to go straight to the paper to figure out what the paper could do before I could even sketch. So [my design process was] simply playing with the paper before I sketched," one 'designer' student explained of how she worked previous to her partner's interaction.[120] When asked, a large majority of the 'designer' students spent less than 5 minutes sketching prior to amalgamating with their 'skilled' counterpart. "I think all of us went to the paper before we sketched."[121] While sketching is an intuitive way to

[119] In discussion with the author.

[120] In discussion with the author.

[121] Student in discussion with the author.

visually explain a concept or idea, this way of working proved that when working with a material, it is imperative to engage and understand the material as part of the design process.

Contrastingly, other students opted to give into compromising design in exchange for what they felt the paper was capable of. "I think that the problem is we usually design stuff on paper, and you have access to all these ideas that are hypothetical, and then when it comes to actually trying to make it, you realize you're more limited than you thought you were. You can have this great design, but you don't know how to make it at all," explained one student, frustrated with what was actually buildable in the provided material. "Then you have to go back to the drawing board, and keep making simpler drawings, until you realize 'I can make that.'"[122] These ways of working are important for an educator to be aware of. Rather than allowing students to get caught up in their inabilities to work with a material, teachers must be able to direct and enable the students in ways that instill confidence, and encourage a continually explorative process.

The collaborative nature of the activity was one that many of the students in the introductory design class had yet to experience. This proved for some, challenging, but given the nature of the activity and the time constraints, many of the students found the partnerships beneficial to their process. "When I had a problem it kinda turned out that she fixed it for me before I could figure it out. [It was] not necessarily one person leading, and if there was any [one leading] the other followed up to become equal," explained one student, discussing the power dynamic between himself and his partner. [123]

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[122] In discussion with the author.

[123] In discussion with the author.

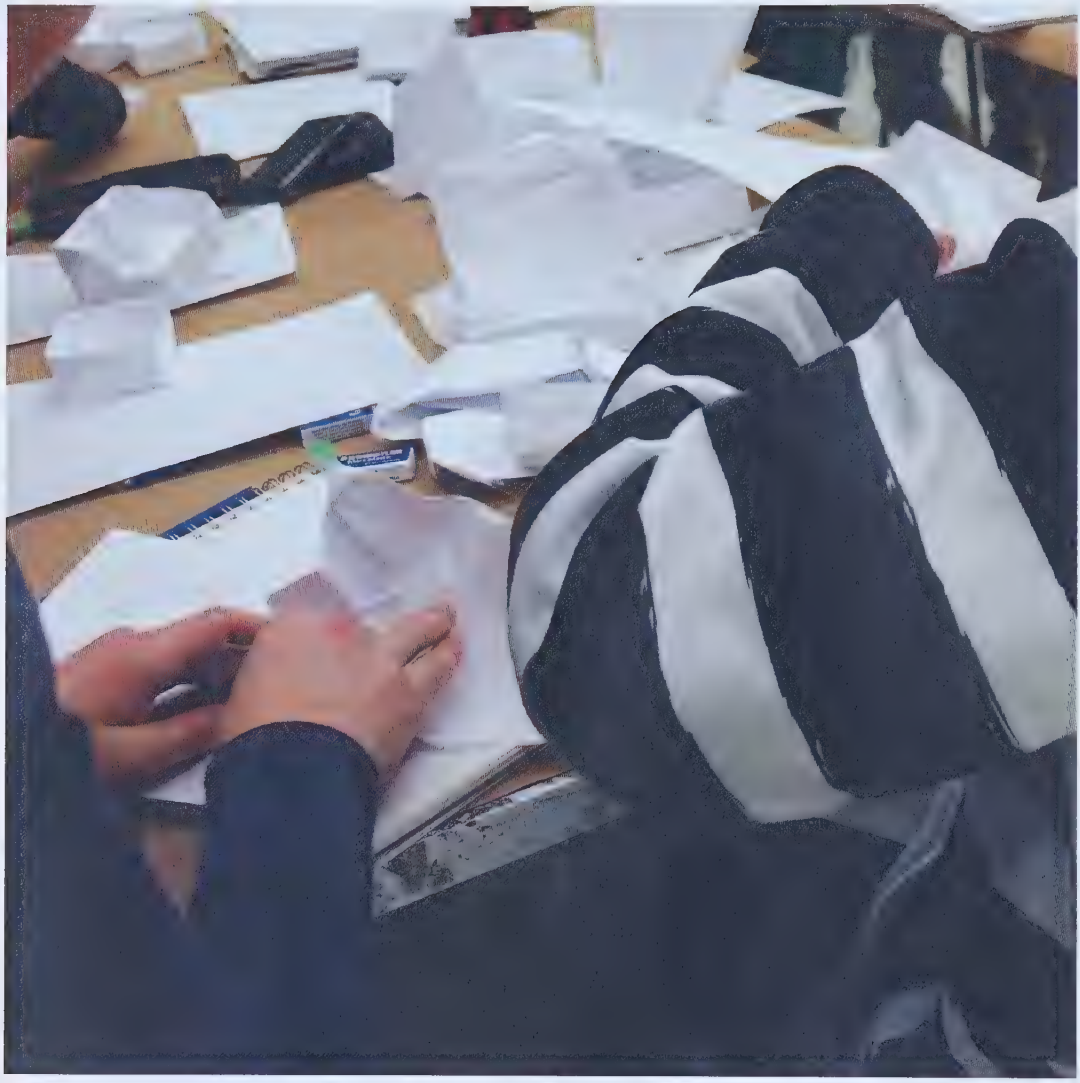


Image 48: Students making together to generate ideas.

Working with a partner allowed for a chance to exchange ideas, but also to teach one another the skills which they had learned. "I used a similar technique that you did [when teaching the paper manipulations]. Fold, and build, and have them follow along is how we taught eachother. It seemed to work best, we didn't even try anything else because it was easiest to do it together, we'd do it alongside one another," a student described when asked about the teaching process.[124] "[Performing] the techniques tandemly worked best," explained another student. "It kinda gave you the step by step, cause then you can see it, 'not this way, turn it and fold.' It's easier to have your hands busy as well as somebody else's so you're not tempted to get in the student's work as you're teaching."[125] By working side by side, the skills were learned through observation, but also through performance. The students were able to watch as the more experienced partner went through the manipulations,

One student, when asked if his skills learned in the paper manipulation session were beneficial, summarized the experience between him and his partner, stating "I think having some new knowledge about what to do with the paper definitely helped create a better design. I think having the structured and un-structured creates so many more opportunities. When I came back to my partner we collaborated very easily. I think it's very important to know your product in and out, it's crucial to have both structured knowledge but it also aids to have elements of intuition and creativity."

[124] In discussion with the author.

[125] In discussion with the author.

Peer-to-Peer Collaborative Making

Two collaborative projects were undertaken as part of this body of research. First, a series of prints created between two printmakers of dissimilar disciplinary backgrounds, Amanda Forrest-Chan, and Grace Sippy. Secondly, an installation that was commissioned for the Latitude 53 Parka Patio Party as a joint effort between myself and three undergraduate students in the design program at the University of Alberta; Christopher Camp, Iwona Faferek and Brendan Gallagher. While both were undertaken with no monetary benefit to the participants, all were informed that it would be a collaborative and learning experience that would be rich in other ways. Participants were to bring their unique expertise to the project, contributing knowledges that others in the project may not have previously held.

Forrest-Chan specializes in relief, and wood cut work. She often uses more 'rudimentary' techniques to print, and enjoys the feeling of carving with her hand to create objects for printing. Sippy tends towards a less tactile form of printing, often using digital, lithograph and screen print in her pieces. When brought together with the idea to teach each other printmaking techniques unfamiliar to the other through making, they agreed upon two styles, Forrest-Chan would teach collagraph, while Sippy would teach monoprint. The decided to overlay these two techniques to create works that combined both of their specialties along with the other's, and had both of their marks in their own and the other's chosen method.

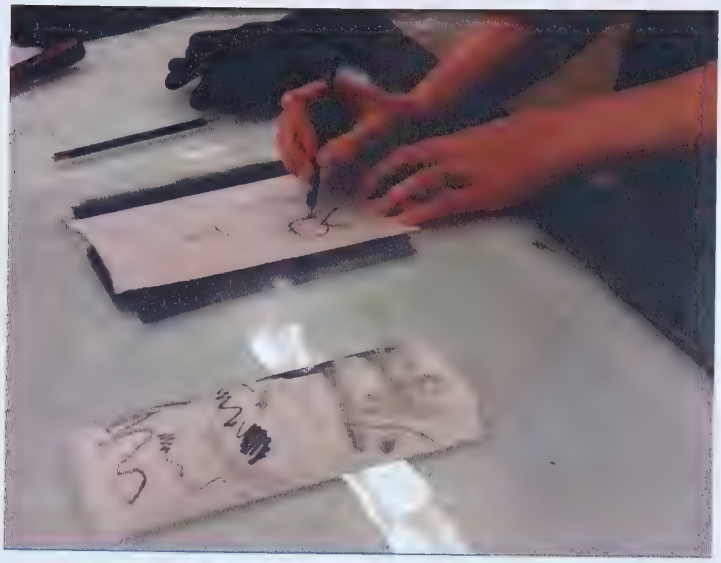
Much negotiation occurred 'on the drawing table,' as the two printmakers mediated their ideas, colour choices and methodologies for combining techniques continually. It was clear that often times language became a factor of confusion rather than clarification. Words used to describe certain actions would be misconstrued, and consensus

was most often found as the printing was being done, and through action and observation. "Weren't we going to join the pieces like this?" Chan motioned, discussing a side by side abutting of the pieces rather than an overlay, "Is that not what we discussed?'[126]

The planning stage often stands to be the most important when approaching a new and unknown project, but here it was clear that the number of meetings spent organizing the process were virtually ineffective when it came down to the making. It was upon setting into the process with open minds that the two were able to more easily come to decisions on what was working best at the point of decision. Pre-determined ideas often fell to the wayside. These acts of necessary improvisation created ideas that were of both artists, this itself becoming a way of arbitrating differences of opinion and approach.

Some of the most revelatory work occurred when I was able to learn the techniques with long side the artists. At one point, both Grace and I were learning collagraphing techniques together alongside Amanda. Being able to relate traditional design-based ways of thinking with the artists, while learning the same technique brought to surface considerations that we were each giving to our piece, and what the other hadn't even thought of. While I was concerned with problem solving, and attempting to understand the precise printing results that each applied texture would yield, Grace was much more free in her application, watching Amanda for guidance when necessary, but not questioning specifics. She was also more confident and comfortable in seeking Amanda's help, where I attempted more often to make decisions on my own, based, most likely, on both pride and unfamiliarity.

[126] In discussion with the author.



Images 49, 50 & 51: Grace and Amanda experiment with monoprint together.

This type of work is an example of Gunn's 'anthropology on' set in practice. "This approach implies continual growth and discovery" By engaging, one is more readily able to understand the learning processes and constant adaptations of familiar practices, and the melding and transformations occurring through the access to new skills, while attuning oneself to the lines of a fluid movement of responding to another's actions.[127]

*Images 52 & 53:*Amanda works through the collagraph process as Grace and I work along side her, mimicking brushing and rubbing techniques through which to generate creativity and marks.

Understood as an under-budgeted labour of love, the Latitude project was approached with a knowing that the reward of completing the installation would have to come in the form of pride, and self-satisfaction. For a designer, a project without a defined outcome was distinct. The client was open to almost any idea that was posed, and put full trust in the team to execute our vision as best we saw fit. Brendan Gallagher discusses the ambiguous process, "There wasn't a right or wrong, the client wasn't very involved and there really wasn't a pay cheque in the end. This made the process really unique, rewarding in that I had never done anything like that before, but difficult as it was essentially an act of voluntary labour. It had to become more of an art piece, we became artists who found joy in simply seeing the completed work."[128] In this way, it seemed that the design and construction of the tunnel became

[127] Gunn, *Learning to Ask*, 333.

[128] In discussion with the author.

about working together and seeing the project through, and not about the monetary or academic reward.

Image 54: The colour chart created for both artists to assess monoprinting hues.

Mediating these benefits within a group of dissimilar interests recalls work done at SPIRE, multiple stakeholders coming together for a common goal, while maintaining unique motives. While I was the designer called to bring the team together, I was subsequently charged with the role of maintaining the collaborating participants' interest. "At times we were only really involved to help you out," said Brendan, recalling the hours of work he put in when he had many more pressing projects to be working on.[129] The challenge then, was ensuring that there were benefits to working on this project for the designers, could this be turned into a learning experience similar to the printmaker's exchange?

Incorporating a graphic designer, industrial designer and a skilled woodworker, the process was organic in how it unfolded, as well as in how contributors participated. Christopher Camp discussed the benefits of working on a project together with people of differing skills. "The strength of collaboration is working with people who have experience other than your own. You learn through osmosis almost, working alongside one another. It can also inform who you go to in the future for help with specific things."[130] "I definitely do a better job, at say, chiseling when Chris is around," explained Brendan, an example of how skills can be strengthened by simply being situated near or accessible to someone who has more expertise than you in a certain skill set.[131]

Within a collaborating environment, the opportunities for learning can occur at any phase of the project and between all contributing partners. When asked who my collaborators on the Latitude 53 project learned most from throughout their undergrad careers, the answer was unanimous. "Peers," was said by each of the undergraduates, explaining

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[129] Ibid.

[130] Christopher Camp in discussion with the author

[131] In discussion with the author.

that the sheer amount of time you spend with your fellow students leads to a greater opportunity for learning. "I learned just as much from students as the teachers," Camp explained.[132] "Even as a teacher I learned a lot, especially when students decided to go above and beyond the requirements of the course, they challenge the teachers just as much as themselves," Gallagher said, discussing a class in which he was teaching students how to use the three dimensional drafting program, Rhino. [133] "Ego has a lot to do with it," added Faferek in response to the question of how you learn in a group environment, "if you're humble you'll learn something."[134]

As the project unfolded, it was clear that maintaining a certain level of confidence within a group dynamic was essential to becoming vulnerable and opening oneself to the opportunity of learning. "Team building pre-collaboration is important, it allows participants to get to know one another, to understand one another. It makes it more about just working together, and by having these team exercises it can get people out of a competitive mindset," Faferek explained, noting that the group came together through means of previous familiarity.[135]

Success in collaborative making can be an ambiguous notion. How does one quantify the accomplishment of a given project, especially one without a given set of criteria or guidelines? "What makes a success is based on the expectations. This was an experiment, and therefore there were no expectations, we left ourselves open to flexibility and the unknown," explained Forrest-Chan. "In the end, this was successful for me because I was able to learn something, the success of the prints as

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[132] Christopher Camp in discussion with the author.

[133] Brendan Gallagher in conversation with the author.

[134] Iwona Faferek in discussion with the author.

[135] Ibid.

artwork is just not as important."[136] The ability for participants to be open to different meanings of success while being aware that the benefits of working together through doing are often not prescribed is essential.

Some of this awareness can be adapted from the way an artist works, and the significance that is placed on process within their work. Forrest-Chan describes how allowing process traces to show in a final work can enrich art; "The evidence of process should be important for everyone looking at art. Process appreciation is understanding how long things take and how things are made."[137] "It's also important right now for a viewer to understand the process because there is just so much unknown about the printmaking process specifically, it's easy for it to be unappreciated," explained Sippy, indicating the assumptions made about making methodologies, and the negative perspectives that can arise from erroneous presumptions. [138]

"Okay, I'm just going to go for it," Sippy stated, after a lengthy deliberation over making what seemed to be random markings with the monoprint process over top of the collagraph print. Personal processes and approaches to making proved to be a primary avenue for learning between collaborators in both projects. By juxtaposing individual's ways of working next to one another, participants inevitably picked up and contributed to one another's working methods. But it was apparent that a more open ended process allowed for the easier transfer of skills and knowledges. "It's interesting, Grace seems to 'feel out' how her compositions will come together. I just go at it. I try to allow the material to guide the creative process. As long as you're creative enough to make the first mark, you can allow the materials you're using

[136] In discussion with the author.

[137] Ibid.

[138] Grace Sippy in discussion with the author.

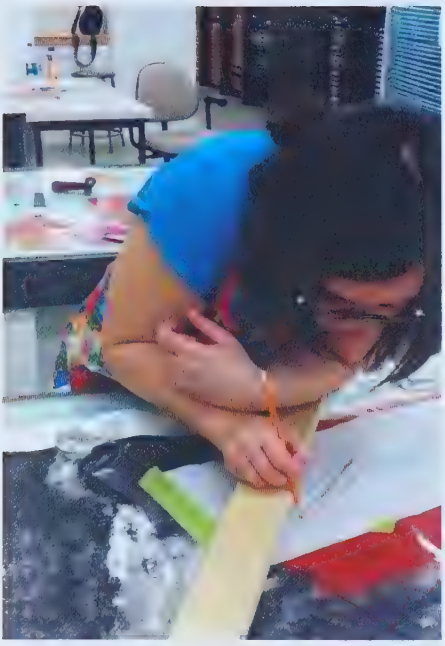

Image 55: Amanda uses a 'bridge' to blindly apply her learned monotype technique to a collagraphed piece.

Image 56: Grace assesses her monoprints done on the collagraphed pieces, and adds another colour and more gestural markings for visual balance. The collagraph took on a form of its own as both artists used the markings to create composition that occurred in the moment.

to inspire the next," explained Forrest-Chan of her typical technique in comparison to her partner's. "I don't often start with sketches, you can't always have a prescribed end. You have to be in partnership with your medium."[139] Such ways of working were then assumed by Sippy, both as a means to make the process run more smoothly, but also as a response to the way Forrest-Chan was engaging on their piece.

In a similarly non-prescribed fashion, Gallagher discussed his allowance of material to guide his process in the tunnel installation and beyond, "Material steers my process every time in a way. I don't define my process. I sort of have a base method that I build off of, kind of a circular thing." [140]In this way, Camp, Gallagher, Faferek and myself were able to continually bounce ideas off one another as we worked. Though we all planned differently, we were able to accommodate changes in budget, materials, space and contributor availability.

[139] Amanda Forrest-Chan in discussion with the author.

[140] Brendan Gallagher in discussion with the author.

Images 57 & 58: 'Event Horizon' in situ. The installation was inhabitated by patrons of the gallery all evening, as they passed through, stopped and assessed the countless decisions that had been made amongst the team over the short two week process.

It was clear that the Latitude 53 project suffered from a lack of time, commitment, and potential (or lack of) repercussion, and these factors all contributed to how certain obstacles were reacted to and overcome. Learning in a context of immediacy creates instances that require quick response, and in a collaborative environment this enforces the necessity to come to consensus, but not necessarily the best solutions.

In the end, when looking at each project, the process is tangibly clear to each team. Dissimilar printing weights in the three art works between Sippy and Forrest-Chan show trail and testing done to achieve a certain depth and heaviness of line, each proving to have it's own qualities. Hole sizes and rod placements in the Latitude 53 installation illustrate hours of drilling, and in the moment decision making when quick

assessment of composition and assembly needed to occur. To the outsider, these may not be obvious, but these marks show the narrative of collaborative making, and what was often a response to materials and the context of the projects.

The final reflection process after either project produced interesting results. "I really like talking about what we did, I really enjoyed this" said Sippy, after discussing the whole art making experience between her and Forrest-Chan.[141] Often artists or designers don't take the time to reflect on their process, their work, their journey. Discussing reasons for choices and decisions throughout the making process brought up subjects not always discussed in what can be an insular practice. Forrest-Chan. Often artists or designers don't take the time to reflect on their process, their work, their journey. Discussing reasons for choices and decisions throughout the making process brought up subjects not always discussed in what can be an insular practice.

[141] In discussion with the author.

Image 59: 'Event Horizon.'

Engagement: To Turn a Spindle

As I push the start button I'm immediately startled by the spinning length of wood in front of me. "Just ride the clutch," Kenny instructs, going over what we have talked about numerous times and the way I need to ease into the lathe by first leaning on the guide. I place the gouge on the guide and slowly lower it towards the wood, very slowly. As it hits the square spindle it jumps back, and in turn, as do I. Quick as I can, I gain composure and again, slowly lower the gouge from it's upward angle towards the turning timber.

Images 60 & 61: Beginning to turn a spindle, and gaining confidence to begin beading.

This time it hits taken and I press on, keeping a steady pressure on the gouge tool as I can feel the carver remove material. I can see and hear it too, although it doesn't sound as smooth as I've heard from Kenny's previous performances. Rather its staccato tapping gives me the information that I need to apply more pressure to smooth the edges of the piece into a cylindrical form. I muster the courage to press on, knowing that timid engagement will not help at this moment. As I press forward the edge of the gouge catches the piece and throws it from the lathe with a large crack. I'm visibly shaken, and immediately turn to Kenny for direction, support, reasoning.

"Keep your pressure on the guide, and slowly lower the tool to the wood, don't force it," he says again. I gather myself and insist on trying again immediately. With the piece of wood re-secured in

the chuck I turn on the lathe once more. This time I focus on the wood's response to my tool, not the end result that I'm so directly aiming for. I take the gouge down to the wood and concentrate on a slow and steady movement across the guide and spinning length. With constant pressure I move across the wood, adjusting the guide as I go, listening to the chatter become quicker and less pronounced as the wood smoothes under my hands. I get near to the chuck and lift the gouge, proud of what I've done, a complete pass with fairly even force and visibly even material removed from the once square piece.

"Now lay the gouge on top of the piece," Kenny instructs, and as I do my confidence vanishes. The chattering begins again as the metal rod bounces up and down on the spinning piece that is quite obviously not yet rounded. I turn off the lathe and inspect my work. The corners have been curved, but it is nowhere near a cylinder shape.

Image 62: Catching the spindle after not listening and feeling for the signs of resistance. The piece is thrown from the lathe.

It is the end of the day before I can make a smooth spindle, and days or weeks before I am able to progress to more advanced shapes. But the respect I have for the wood was formed on that very first turn when I imposed, rather than responded.

Image 63: Turning at the lathe

PART 5:
Conclusions and Beyond

There are ways of being that are fundamental to the way we are. Tim Ingold states that these ways of being include, beyond walking and talking, the act of drawing.[142] But I argue that drawing can easily and almost more readily be replaced with making in this inventory. Similar to Ingold's description of drawing as trace leaving and as having a story, the act of making as a gathering process rather than a projection will involve the knowledges, gestures and experiences of the maker. These acts are not simply a projection of preconceived notions, of designed ideas, or of what is already of this world, they are formed through the actor themselves, and are rich with meaning.[143] It is a process that gathers and becomes, it is a reaction to material, context and the internalized circumstances. It cannot be drawn in a CAD program and projected, it is a product of a multitude of factors that are occurring within a space at a time, and it is this process that is fundamental to the human.

> The practice of drawing has little or nothing to do with the projection of images and everything to do with wayfaring – with breaking a path through a terrain and leaving a trace, at once the imagination and on the ground, in a manner very similar to what happens as one walks along in a world of earth and sky.[144]

Through practitioner observation, student engagement, and most importantly of all, personal exploration, the idea of a generative process of making and how that affects the human condition, spirit and way of living was at the basis of this study. By understanding the benefits of this way of work, how it countered current technological trends, and how that affected those who utilized these processes on a continual basis, it was clear that there were learning and educational opportunities in such methods. Most all of those involved in this

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[142] Ingold, *Being Alive*, 177.

[143] Ibid., 178.

[144] Ibid.

research spoke to the ideas of utilizing the hand as a way to expand the mind.

Making is, in it's most basic form, an equalizer. It does not exclude, it is not overtly theororized, philosophized, or cerebral (though these characteristics exist at once when one engages). This accessibility allows the exchange of ideas more fluidly than any activity that requires background knowledge or educated understandings. This openness also creates a space for decision-making based on what is occurring in the moment. In spaces such as the paper workshop, one does not need special equipment or dextral experience. In instances such as the printmaking between Amanda Forrest-Chan and Grace Sippy, those participants utilized knowledge that they previously held to create a learning experience for both through the use of skill. But while the act is easily orchestrated, why is it that making itself is not utilized more frequently as a means of learning in education?

Activities of engaged making between disciplines such as those seen in Wendy Gunn's interdisciplinary Critical Reflection course indicate that such open discourses on products, making and materiality foster ongoing critical reflection skills. Students work alongside one another in this way are able to understand what they know and what they don't, and work to bridge these gaps between participants through engaged understanding. Here, instructors are also privy to learning experiences as they can work and make alongside those who are being formally taught, and in this way enrich the learning prospects for all involved.[145]

"Good craftspeople often demonstrate a 'natural' facility for design because the organization of the parts of an object into a whole flows from the thinking that is involved in the creation and organization of

[145] Gunn, *Learning to Ask*, 328.

the parts in the first place."[146] These knowledges required for planning, understanding and engaging with one's hands in a material way teach methods for design thinking in a way that do not prescribe thought, but evoke it.

Taking cue from the processes witnessed, and the mental understandings of practitioners such as Jane, Ken and Marc, their explained improvisational techniques as a way to sort through craft, design and art issues are techniques that were readily acquired by students in the collaborative workshops. Students assumed roles within the making process in a non-linear fashion, working between one another and freely learning, questioning and responding to the process at hand. These students were unencumbered by the prospect of grades, or a predetermined measure of what 'success' would look like. By allowing students to share their knowledges, they were given confidence to participate in the making settings, and contribute what they knew and had learned.

Confidence in making is essential. The students in the organized activities were placed amongst peers, and were able to make mistakes in front of one another and learn from these mistakes together, free of judgment, and in an activity that placed them on an equal level as their counterparts Ken Horne describes the atmosphere that is required for open communication, "they have to somehow feel safe, and I don't mean that in a cut your fingers off way, I mean it in a creative way. So they can come up with bad ideas, and somehow those ideas will get directed into becoming better ideas, but they won't be smashed. It's about creating an atmosphere of some sort of safety, freedom, and confidence."[147]

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[146] Dormer, *Art of the Maker*, 91.

[147] In discussion with the author.

"Craft knowledge is genuine knowledge."[148] Understanding of material and process is real knowing, and embodying real time risk and problem solving skills through making provides a basis of applicable thought processes. Upon understanding any type of making, one has embodied a way of knowing, a perspective, and a new way of looking at life as pieces of a whole. We are constantly in flux, the body and world is never stagnant nor without external or internal influences. As such, an education should foster a way of thinking that allows for these flows of progression in a way that builds upon itself. The use of hand-based problem solving as a creativity generator and intuition builder provides a foundation from which to question, reflect and grow.

In craftwork, "some issues are left unresolved."[149] In this way, the process remains alive and elastic, and when unnecessary pressures placed on work to form a conclusion, often these conclusions are falsely realized. By celebrating the journey and understanding that most revelation occurs through the process and not the end, stories, narratives, thought and understanding is discovered through this valuable work itself.

Conclusive Findings

While the process itself was reflexive, intuitive and organic, working with students, and practitioners through observational and engaging methods yielded real information about how people learn, how you learn through making, and how this process can be best facilitated in an educational setting.

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[148]Dormer, *Art of the Maker*, 68.

[149] Sennett, *Craftsman*, 263.

1. *Making Teaches Thought.* The hand has a strong and unique connection to the brain, and when coupled with sight, techniques can be assumed as a way of learning the skill of anticipation, not only in making, but on a broader scale beneficial to all decision making processes. Working and making require ways of consideration that call for immediate problem solving and communication techniques to be formed within the act. Both students and practitioners are compelled to make quick decisions in response to the task at hand while reflecting on the decisions that came before. This dual track of thought fosters a philosophy that acknowledges the fact that we are part of this world, and must make considerations for it, in making and as a general understanding. Making teaches a philosophy and way of thinking with widespread applications, not a singular trade or skill with specific means and ends.
2. *Generative Movement and Improvisation.* Setting forth on a process, be it walking in the world, drawing a line, or blowing a glass vase, all involve a mediation of external and internal factors surrounding the act itself. Making must be a generative process in order to take into account these factors, and as a process of gathering material (tangible and non) as it goes, it is able to allow for the incorporation of multiple ways of thinking within a single act, and encourages collaborative thought and knowledge exchange.
3. *Collaboration in Making.* Collaboration through making involves a different language, ideas are transmitted through action, and intangible understandings can be made tangible through artifact creation. Using tools and processes that facilitate a tactile engagement allow for observation, mimicry and idea generation, as witnessed in the PaperProject, the Graduate Printmaking Project, and the Latitude 53 installation. Collaboration in open-ended, improvisational situations works well to include ideas as

they occur and as problems arise, pulling on strengths from the team as required.

4. *Importance of Context.* In order to make possible the desired learning opportunities, one must consider the multiple contexts occurring within the action. Especially in a collaborative setting, attention to narrative, history, and culture may influence knowledge exchange and understanding of activity (as in the PaperProject when students' past experiences influenced their collaborative activity). Social factors such as the confidence levels facilitated in a given situation also place pressure on how one engages and shares knowledge. Peer learning and being able to admit 'not knowing' are proven strategies for making environments to promote ideas that are not self-consciously concealed. Such successes occured in both the PaperProject, the Graduate Printmaking Project, and most overtly in my personal engagement in many of my 'doings'.
5. *Simplicity.* Learning through making and doing can be hindered by confusion and complexity. Pared down engagements focus learning on a single act, and allow room for creativity, improvisation and mistake. Rather than learning through the act of building a coffee table with precious mahogany, more is gained by sawing a piece of poplar and understanding how such a piece can be joined to another, or even how to shape a bowl out of a leaf of paper. Simple materials, simple techniques and an unencumbered ability for the actor to explore will prove for a more enriched learning experience.
6. *Reflection.* Finally, reflective practice is essential in the act of making. The ability to intuitively check back to previous steps in order to understand where ideas came from, why marks were made, what the origins of trajectories were, creates an implicit dialogue within oneself that informs further decisions, and creates feedback loops that can be traced by collaborators for

further understanding. Reflections-in-action (or, to begin, overt pauses for repose) stand as checkpoints, and proliferate a process that incorporates the actor within it, not removing the actor (designer, artist, practitioner) from the act itself.

The idea of learning through an active and engaged means creates instances where those learning are often given the role of the teacher, and vice versa. Learning occurs between participants in ways that allow unexpected findings, and ways of thinking and communicating. Understanding processes not only allows for more holistic design processes and products in design students, but a physically engaged methodology can teach ways of thinking and knowing in a multitude of disciplines and backgrounds, as seen in this body of research. By providing environments that encourage open exchange through doing, barriers are broken down between the traditional master and apprentice, and unconventional opportunities for teaching and learning are revealed.

Going Forward

The university institution abides by systems that encourage and 'end is greater than the means' mentality. While society rapidly evolves and technology advances, educational systems have conformed to single tracked industrial efficiency.[150] Though technology is a robust asset to the educational system, the making process provides strong benefits as a way to learn to know and think, as an organic form of journeying through generation and improvisation, as a tool for teaching collaboration between different knowledges, as a way to understand

[150] Ken Robinson. *Out of Our Minds: Learning to be Creative* (Oxford: Capstone, 2001) 170-171.

personal, social and cultural narrative, and as a method for teachers to learn along side their students. Simplistic activities (such as the PaperProject) can prove to bring students together through an accessible activity to which either party is unfamiliar, creating common ground and reciprocal learning. In introductory stages of learning, removing focus from the final product, and rather emphasizing the journey to get there pushes students to be more willing to open up to improvisational techniques, creative thinking strategies, and sharing of knowledges. Minimizing external pressures on destinations, and providing open frameworks that incorporate others within a communal, and apprentice like learning environment can lead to unexpected, and challenging results. Academia should work to nurture human passion and the many types of creative thought that exist today. Open and lateral thinking that incorporates multiple ways of knowing is essential to sustaining and propelling innovation in the design realm and beyond. It is the integration of a practice focus then, rather than product, which can provide for a more exploratory and revelatory learning experience.

Engagement: The Chair, Complete

As I complete my chair, a project that has followed me through the course of this thesis, I reflect on the research as an entirety. I see now, mistakes I have made on this chair from the very beginning, material choice, geometric decisions, but there has been much learned. I have learned to consider the external forces of a situation as contextual influences on my work, how my confidence affects my design decisions, how collaborating with others can make me bolder in such decisions with their skills at my disposal. I have discovered how I learn best and from whom, and how to ask the right questions. As I so carefully sand and finish the walnut, I am aware of how precious material choice can become a crutch, and how it can inhibit a full exploration in form and technique allowed in simplified design situations. I see the marks of my hand, where the router tore the piece from my grip, where we made some geometric decisions that weren't originally accounted for. As I try to sand these out, I stop. I appreciate the time and skill it takes to perfectly create, but realize that rather than erasing mistakes, these should be learned from. Maybe this final chair is really not the final at all, but just another jump off point in a series of products from an endeavor to learn through doing.

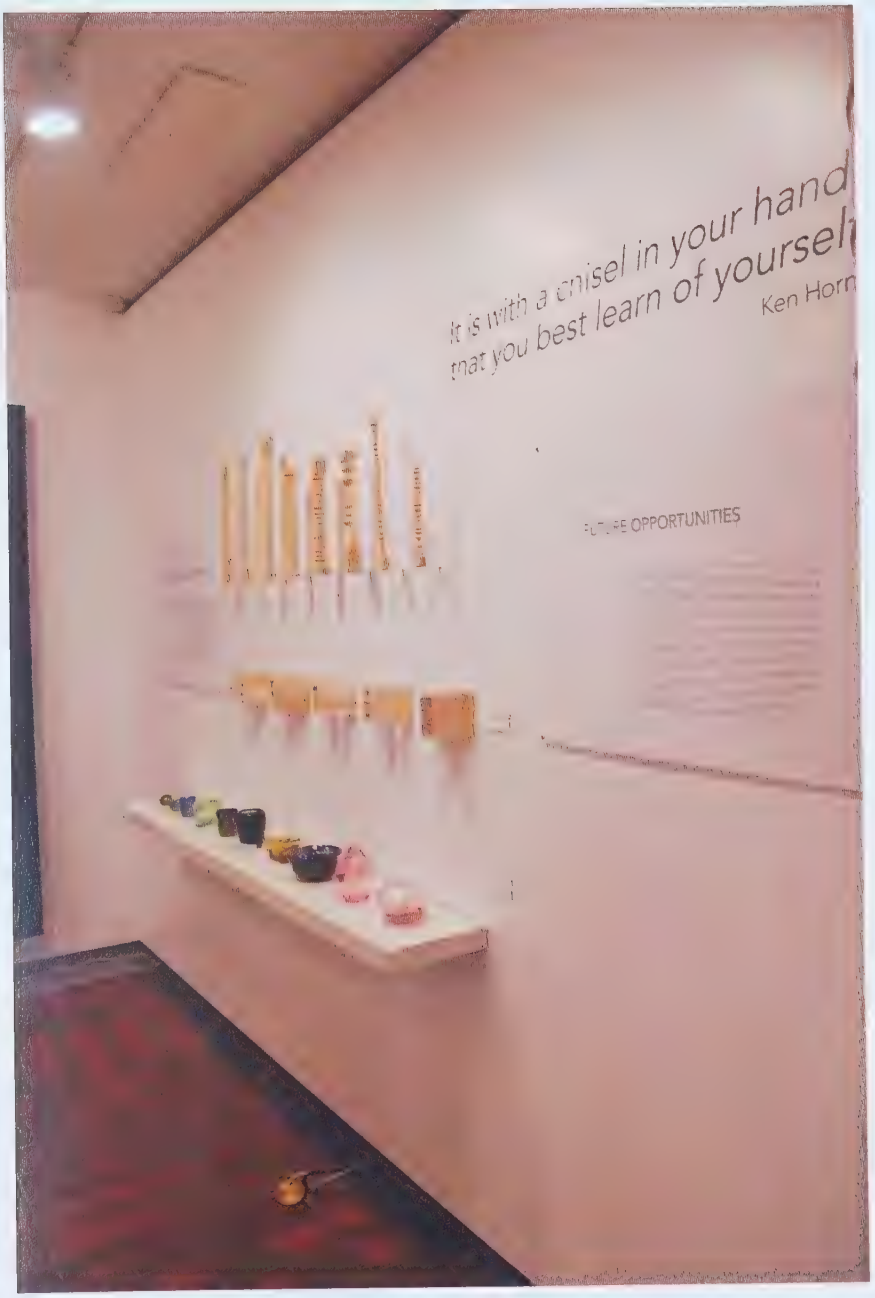
Image 64: Perfecting the cross joint of the chair by hand chiseling.

Images 65 & 66: Hand working the centre pivot joint in order to achieve the correct geometries.

Image 67: Handworking the chair.

Images 68 & 69: The chair prototype, complete.


For the things we have to learn before
can do them, we learn by doing them



Images 70, 71 & 72: The final exhibition.

Appendicies

APPENDIX A
Extracting Intangibility: From River Valley to Back Alley

The study of the preservation of intangible cultures in Edmonton forced thought on invisible ethos within the city that cannot be necessarily touched or seen. Often, it is these aspects of a city that have more influence on how it lives than the built environment itself. But intangibility can be a difficult concept to understand, and even more complicated to study and exploit. Similarly, the intangible nature of work, practice and physical engagement can be difficult to quantify. How does a feeling or an act become something that can be expressed visually?

This concept of an intangible culture is one that can account for much of society's history and past that hasn't been documented within physical object culture. Skill and craft knowledges are visible through their products, but a specific way of working has an intangible nature that can be difficult to study, celebrate and preserve. The consideration of craft and skill as an intangible culture forces one to rethink how The study of under-utilized spaces in Edmonton's downtown core was catalyzed by research done on the intangible culture surrounding the North Saskatchewan river valley. By looking to further understand and celebrate such cultures, one needs to orchestrate instances of revealing and exposing that, which cannot be commodified.

Intangibility raises issues of how a designer can work to reveal the unseen. Processes involved in making and creating often are more important than the produced object itself, but are harder to preserve due to their non-physical nature. It is the way in which we illuminate these processes that can provide insight, appreciation, and further exploration to the user and practitioner. In this way, the way in which we work and the stories involved in such work are necessary in the perpetuation of meaningful engagement in material culture and design.

What is the intangible culture around making, designing, doing? It isn't so much about the end, but the evidences of the means within the end. It is about that which can't be touched, the knowledge that is passed between participants and present in the maker, and the way in which they engage.

The river valley serves as an environment celebrated and revered by Edmontonians for both its natural beauty and sense of retreat separate from the busy city atmosphere. This segregation, combined with a seemingly elitist preservation of the valley prompted further research into the integration of the intangible culture into more accessible existing spaces within the urban fabric.

By extracting the concept of the sublime from the river valley and interpreting it through the lens of the urban, I searched for what I believed to be instances of both beauty and horror in the raw infrastructure of the forgotten interstitial spaces in Downtown Edmonton. This led me on multiple journeys through back alleyways and vacant lots, while carefully noting moments of activity, layers of shape, colour and infrastructure, as well as evidences of use or the lack of use.

An introduction to the philosophies of Patrick Geddes, a Scottish biologist, sociologist and town planner in the early 20th century served as inspiration for the action to be taken within the found spaces. Geddes was a large proponent for a regional view of urban planning and the understanding of intimate cultures influencing each site, in turn avoiding ubiquitous solutions for disparate problems. Contribution from local users of the space was also paramount in his theory on improving urban and social issues. His work on the Camera Obscura in the Outlook Tower in Edinburgh, Scotland, allowed visitors a unique

and unexpected vantage point of the everyday world and allowed them to reconsider their surroundings on multiple scales.[151]

The final result of this research takes the form of three minimalistic weaving installations that use found objects of each site and rework them with the addition of a new material to create a moment of the unexpected in what may be considered a banal space. These pieces highlight the crude beauty of the urban built environment and urge the viewer to rethink the potential of the spaces. More importantly, viewers are intended to consider how they can further contribute to, inhabit and appropriate the space, and take part in the process. The materials and patterns used are simple, loose ends allowed to hang in order to provoke the viewer to engage and alter the model. The works are intended to serve as a catalyst for thought and conversation about the reevaluation of slow (contemplative, pause, rest) space integration into the urban fabric.

While the Edmonton river valley is thought by many to be strictly a space created for often-expensive recreational activities of biking and cross-country skiing, such urban slow-scapes would be less removed and more accessible to all. By using the act of creating an equal platform for engagement, people of different backgrounds are able to come together and appreciate the unseen. Similarly, the use of a making process to share knowledge, create new ways of knowing and reveal is a force that can connect many disciplines of participants and thought.

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151 Helen Meller. *Patrick Geddes: Social Evolutionist and City Planner*, (London: Routledge, 1990), 45.

APPENDIX B
Proposal: The Nomadic Workshop

'Create: the nomadic workshop', was constructed as an attempt to better understand and share the skills of knowledgeable craft practitioners. It was based on personal experiences with skill-based making, knowledge of a changing society, and research done on the topic of craft and workmanship. The concept allowed the general interested public to visit the workshops of local craftsmen and women around Edmonton and beyond, while having space to participate in the specific types of crafts that are being produced there. The workshop focused on the flow of open dialogue between the skilled crafter and the public, and a place to facilitate a learning experience for both parties, a true exchange.

The purpose of this proposed initiative was to further explore the re-incorporation of skill into a strictly regimented technological age as a step to maintain craft relevancy.[152] The work of a craftsman provides an unconventional approach to what is considered the 'designing' of today, one that can be thought of as a more cognizant and sensitive practice considering material, memory, anticipations, techniques and responses to changes in the process. These open-ended considerations work together within the practitioner in order to produce what seems like predetermined actions, but are rather continually adjusted responses.[153] Even the simple sawing of a board requires constant 'sensory correction', no two strokes are the same as the worker constantly compensates for the response of the tool, material, and forces applied and returned. This is the product of the "intimate coupling between

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[152] Tim Ingold, *The Perception of the Environment: Essays in livelihood, dwelling and skill.* (London: Routledge: 2000), 79.

[153] Charles M. Keller *Thought and Production: Insights of the Practitioner*, in Anthropological Perspectives on Technology, Ed. Michael Brian Schiffer (Albuquerque: University of New Mexico Press, 2001) 40.

movement and perception that governs the work of the craftsman."[154] Tim Ingold discusses the differences between making and growing, stating that rather than regarding weaving as a modality of making, the reverse should be considered. This suggests that the weaving (in this case) is more *generative* of the final form, rather than *revelatory*, indicating that the form is not completely preconceived, but rather should come about from the essential processes set forth on it ("Making Culture and Weaving the World" 64). The process of making is then intrinsic in the design process (or is the design process), and should therefore be hugely influential to in the production of the object.

The workshop was to service local participating crafters who volunteer access to their spaces along with their expertise for a participation session. Sessions would be scheduled intermittently over the four month summer period.

'create' would provide:

- a collapsible and expandable tensile/compressive structure to contain participants and facilitate project engagement
- necessary tools and work surfaces required to perform the session specific craft
- general knowledge staff to assist participants with familiarizing themselves with necessary tools etc.

Participating volunteer crafters would be given benefit from hosting the sessions by garnering exposure with the general public, and creating a more accessible image for their craft. Crafters would also be able to share their experiences and stories, the heritage of their craft and the history of the making. At the same time the seminars would

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[154] Ibid, 74–76.

demonstrate the objective benefits of crafted products, and the personal benefits of participation in the craft process itself.
A workshop such as 'create: the nomadic workshop' could work to be an essential tool in revitalizing and sustaining the processes of hand making and craftsmanship in our continually industrializing society. Without creating these local opportunities for the exchange of such knowledge, handcrafting and making skills may disappear along with their benefits, narratives and historical lineages.

This idea works to preserve and perpetuate ways of working that accommodate the innate human need to engage in and affect one's world.

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Participant Consent

PARTICIPANT	DATE/SIGNATURE
P1	
P2	
P3	
P4	3/18/2013
P5	
P6	
P8	
P9	March. 18th
P10	2013.03.18
P11	10/04/12
P12	
P13	
P14	Oct 4th 2012
P15	Oct 4 2012
P16	October 2, 2
P17	
P18	2012
P19	
P20	2013-03-18
P21	